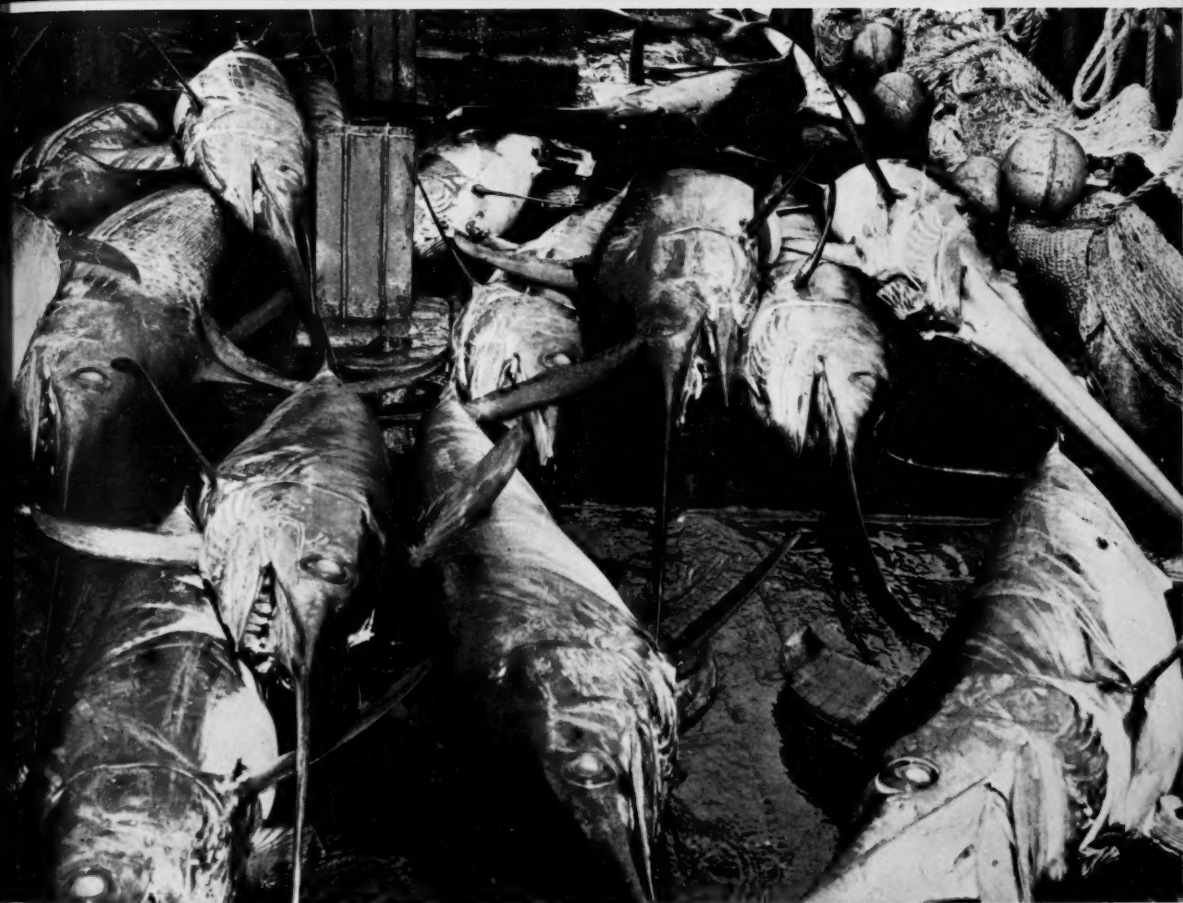


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AUGUST 1963

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COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
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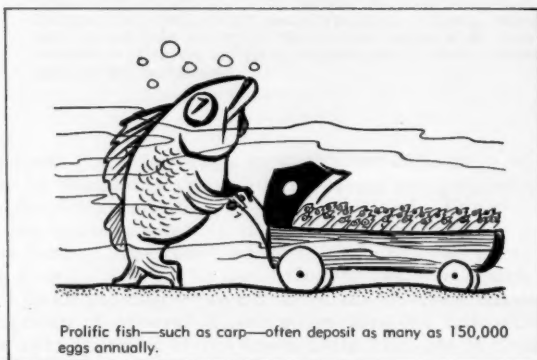
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MECHANIZING THE BLUE CRAB INDUSTRY

Part II - Measures for Immediate Relief Through Worker Specialization

By Charles F. Lee, George M. Knobl, Jr., Robert K. Abernethy, and Emmett F. Deady*

ABSTRACT

This article suggests how the efficiency of the picking operation in the blue crab industry can be improved (1) by utilizing each worker's skill maximally, (2) by choosing the workers for teams according to their skill in each special operation--cleaning, lump picking, and flake picking--so that the work output of the team members is balanced, and (3) by improving the method of material transport among workers.

SUMMARY

Suggestions have been made for ways in which the efficiency of blue crab picking plants can be improved. The fundamental alteration involves assignment of workers to specific duties in which their individual abilities are fully utilized. For maximum efficiency, it is necessary to balance the system whether it be a small work team of 3 or 4 members or a team several times as large. An excess or deficiency of crab parts at any worker station should be avoided. In general, owing to the different rates at which each operation--cleaning, lump picking, and flake picking--can be done, the desired balance is easiest to obtain when the team is composed of several times more than the minimum number of workers required. With suitable arrangement of the team units and use of chutes to move material for small groups or of trays and a gravity roller-conveyor system to move material for large groups, material being handled can move freely through the system without the loss in time that is involved in hand-carrying from one place to another.

With these relatively simple and inexpensive modifications of present practice, the contractor believes that most crab plants can operate at a profit even when all workers are paid the minimum wage required under the amended Fair Labor Standards Act.

BACKGROUND

The blue crab industry employs a large number of workers to pick the meat of cooked crabs by hand. Prior to September 1961, these pickers had been paid on the basis of the amount of meat they produced. Since that time, an amendment to the Fair Labor Standards Act has required crab pickers to be paid a minimum hourly wage. In mid-1961, Congress recognized the problem that this regulation would create for the crab industry and provided the U. S. Bureau of Commercial Fisheries with funds to help the industry through mechanization of the hand operations.

To investigate the problem of mechanization, the Bureau employed a contractor (1) to survey the blue crab industry to determine its exact requirements in regard to mechanization, (2) to suggest the machines needed, and (3) to develop specific recommendations for increasing the efficiency of the present industry, thereby enabling the plants to operate at a profit during the interim period before the machines become available. The purpose of this,

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the second article in the present series discussing the contractor's findings, is to report his recommendations for increasing the efficiency of present plant practice.

The main topics discussed in this report are (1) the basic principle underlying the contractor's recommendations, (2) the grouping of workers into teams, and (3) the contractor's operational suggestions.

BASIC PRINCIPLE

The principle on which the contractor based his recommendations for increasing the efficiency of the picking operation (which is the operation requiring most of the hand labor in the industry) was, in a word, "specialization." His team of engineers made intensive observations of a group of pickers in a typical Maryland plant and then, on the basis of these observations, developed a plan for modifying the picking procedure. Before recommending their proposed plan, however, the engineers tested its workability in a second plant.

The basic principle of their recommended plan was to assign the individual worker to a special task that observations and trials demonstrated he had the ability to perform with above-average speed or skill. One worker may, for example, pick crab claws more rapidly than another worker, who is perhaps rather slow but who, by virtue of his greater care, might do an excellent job of separating the relatively high-priced lump meat in large pieces and with maximum yield. In short, the essence of the plan is that through observations or time trials, each plant manager groups his workers according to their individual abilities.

TEAM FORMATION

The next step is to select groups of workers to form teams to perform the three fundamental operations of (1) cleaning, (2) lump picking, and (3) flake-meat picking. The primary consideration in making up the teams is to achieve balance among the workers assigned to each operation. Ideally, work should flow smoothly between operators, with minimum accumulation of crab parts at any one point, but with an adequate supply of crab parts to keep all operators busy.

The following discussion of the duties of each job may be helpful in the selection of workers:

1. The "cleaner" removes the back and legs of the crabs and scrapes the body core to remove the unwanted parts (gills and viscera, etc.). This job requires moderate speed and the ability to cull out crabs of poor quality.
2. The "lump picker" makes two back slice cuts and extracts the lump meat. This job needs maximum care, precision, and dexterity, rather than speed, since lump meat is a premium-priced product; both maximum size of lump and maximum yield must be obtained.
3. The "flake (residual body meat) picker" takes out all the remaining meat from the back slices and body. This worker needs above-average speed combined with the ability to work cleanly and to extract the maximum amount of this residual meat consistent with fairly rapid handling.

OPERATIONAL SUGGESTIONS

In practice, perfectly balanced teams consisting of one worker for each task are difficult to obtain. Moreover, some workers, after short periods on special jobs, increase their productive capacity considerably, whereas others may already have been working near their maximum rates. In order to obtain the desired balance, the individual workers may be re-assigned, or the size of a group may be increased. In the determination of the size and make-up of the group, economic factors such as the price and supply of crab must be considered. Also to be considered in the effort to achieve maximum plant efficiency is the method of transporting the raw and the processed material through the system. In the following discussion, these topics are considered in more detail.

WORKER ASSIGNMENT: A cleaner may work too fast for the other team members and, if so, should be shifted to a faster group for maximum efficiency. Flexibility should be maintained, especially in the first weeks after the new system is installed. The operation of the groups should be closely observed.

GROUP SIZE: During plant trials with selected worker teams, the contractor found that owing to the different times required for each operation, it was difficult to obtain the desired system balance with picker teams composed of only 3 or 4 members. Although it may be assumed that more evenly balanced teams would be obtained after observation of worker skills over a longer period and through shifts between groups after the skill of each worker became better known, the use of large groups does offer advantages. With four or more workers on each specialized operation, there is a considerably greater chance of being able to compensate for the difference in time required for each operation.

In the plant under study, the average time required for pickers to perform each step per crab was as follows:

- | | |
|--|---------------|
| 1. Debacking-cleaning, | 7.9 seconds. |
| 2. Cutting back slices and removing lump meat, | 6.2 seconds. |
| 3. Picking two back slices and core, | 16.5 seconds. |
| 4. Picking two claws, | 15.3 seconds. |

In actuality, there was a wide variation in the rates at which individual pickers performed the operations; for practical purposes, the "average" worker does not exist. These data

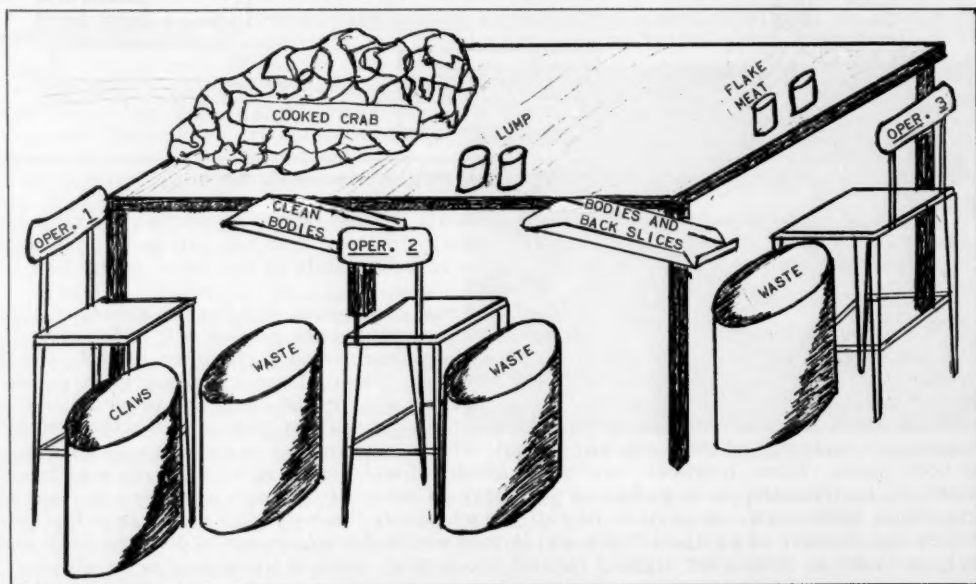


Fig. 1 - Basic team operation.

Operator 1, removes and saves claws, pulls off back and legs, scrapes out body cavity, culls out poor quality crabs; needs moderate speed and good judgment of condition of crabs.
 Operator 2, makes two back slices and removes lump meat; needs care and dexterity to get maximum yield of large-sized lump.
 Operator 3, removes the flake meat from body and back slices; needs above-average speed and dexterity to salvage maximum amount of residual body meat.
 Note: Operator 2 may pick some back slices, or a fourth operator may be used to the right of Operator 2, to assist with the final step. Claws are picked as a separate operation.

serve only to emphasize that team operations are not readily subjected to balancing with a simple 3- or 4-member team. By increasing team size, balance can be obtained with increasing simplicity, limitations on group size being imposed chiefly by the problems of material transport. Four- to six-worker teams can operate at one table by adaptations of the principle illustrated in figure 1. For large plants, groups of 4 to 10 specialists may be profitably concentrated in a single work area with some type of mechanical transport of material between work areas (fig. 2). A larger group also has the advantage that supervision of the operation is simplified, reducing management problems.

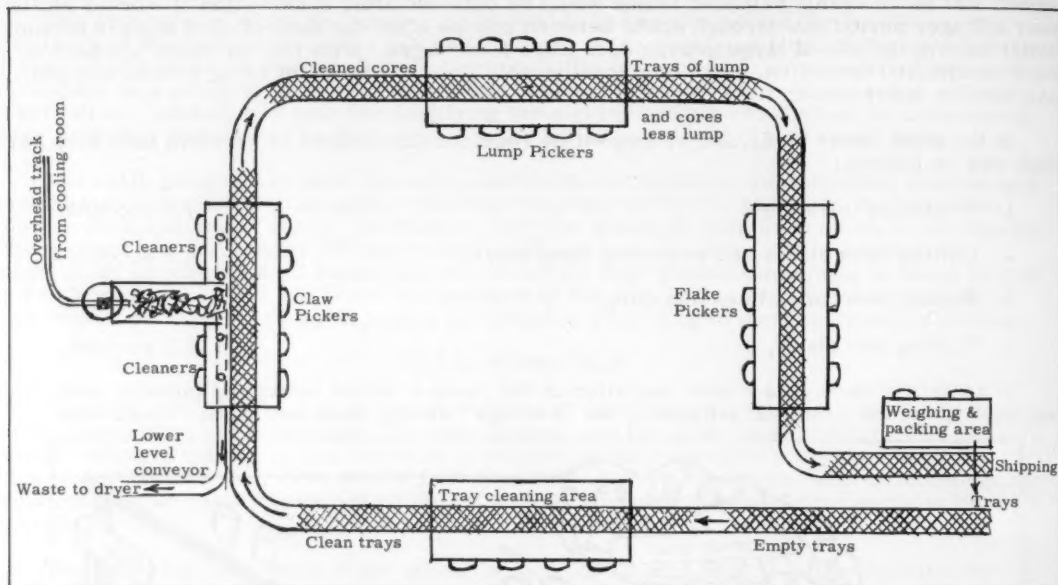


Fig. 2 - Large group operation using gravity wheel conveyors and tray system.

With one or more balanced large teams, a small "flying squad" of workers having general skills could be developed and kept mobile, ready to move into any gap or to back up the regular crew if, for some reason, material began to accumulate at any point in the line.

ECONOMIC CONSIDERATION: The price of raw crabs and, to a lesser extent, the amount of cooked crabs that should be picked during a given work period will indirectly affect the picking operation. When, for example, crabs are scarce and their price is high, it will be profitable to pick the meat from the "back slices." These slices are the pieces cutoff by the lump picker so that the lump can be removed from the cell of cartilage in which the lump lies. When crabs are scarce, it may pay to assign an extra flake picker to the team to permit maximum recovery of the back-slice meat, which may amount to as much as 24 percent of the body meat. When, however, crabs are abundant and their price is low, it may be more profitable to instruct the flake picker to pick only as many of the back slices as she can without forming a bottleneck. In periods of glut, or whenever the supply of crabs is out of proportion to the number of available pickers, it may prove advantageous to discard back slices entirely in order to obtain the highest rate of production, even at the sacrifice of yield.

MATERIAL TRANSPORT: For teams composed of 3 or 4 workers, it is convenient to work on two sides of a rectangular table from a pile of cooked crabs in front of the cleaner (fig. 1). A chute on the edge of the table can be used to carry the cleaned cores to the lump picker on the cleaner's right, and a second chute can be used to carry the back slices and bodies, minus lump, to the 1 or 2 flake pickers at the end of the table.

With larger groups, it may be practical to install a gravity-wheel conveyor system to carry the material from one group of specialized workers to another, as illustrated in figure 2. At one end of the rectangular work area the cleaners sit at a table, and conveniently located on the opposite side of the table sit the claw pickers. The conveyor carries the pans of cleaned crab cores around the corner to the lump pickers. The back slices and partially picked cores move in trays by conveyor to the larger group of flake pickers. Just beyond this point, the trays of cans, or pans of picked meat, move on a take-off conveyor into the packing area, where the weights of the cans are checked and the cans are capped and iced for shipment or storage (or alternatively, are pasteurized). The now empty trays are returned via the conveyor to a tray-cleaning area. From this point, the clean trays complete the circuit back to the cleaners' table. An under-the-table conveyor system can also be used to remove the waste. An installation of this type can operate efficiently when the number of workers in the group range from 20-40 or more.

BIBLIOGRAPHY

LEE, CHARLES F.; GEORGE M. KNOBL, Jr.; and EMMETT F. DEADY

1963. Mechanizing the Blue Crab Industry. Part I - Survey of Processing Plants. Commercial Fisheries Review, vol. 25, no. 7 (July), pp. 1-10.

Note: Part III - Strengthening the Industry's Economic Position, will appear in a later issue of the Review.

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LIVE ALASKAN KING CRABS ON DISPLAY AT SEATTLE MARINE AQUARIUM

In reporting on the donation of live Alaskan king crabs to the Philadelphia Aquarama in April 1963 (Commercial Fisheries Review, May 1963 p. 15), no mention was made of those on display at the Seattle Marine Aquarium. The Curator of that Aquarium called this oversight to our attention and supplied the following information.

Live Alaskan king crabs (Paralothides camachatica) are on display at the Seattle Marine Aquarium. Four specimens (all male) were donated to the Aquarium by the U. S. Bureau of Commercial Fisheries, but one died and the three remaining crabs are reported doing well in their new environment. The crabs were collected near Juneau, Alaska, by SCUBA-equipped diver-biologists from the Bureau's Auke Bay Biological Laboratory under a permit issued by the Alaska Department of Fish and Game.

After their capture, the crabs were placed in styrofoam boxes packed with snow and kelp and flown by jet plane, about the middle of April, to Seattle where they arrived several hours later alive and kicking. The Curator of the Aquarium said that three of the crabs took immediately to various food items given them. The fourth crab made no attempt to eat anything and died four weeks later. The remaining three crabs very readily accept frozen herring--about one fully-grown herring per crab daily. In between the daily herring ration they also feed on various echinoderms (mainly starfish and sea cucumbers) that are kept as supplementary food items in their individual tanks. Each crab resides in its own 400-gallon tank. The water in the tanks is kept at a constant 51°-52° F. temperature in an open-circulating water system.



Live king crabs on display at the Seattle Marine Aquarium.

The live Alaskan king crabs now in captivity in the United States total nine. Besides the three at the Seattle Marine Aquarium, the others are on display at the New York Zoological Society's Aquarium in New York City and the Philadelphia Aquarama.

ACTIVATION OF U. S. BUREAU OF COMMERCIAL FISHERIES RESEARCH VESSEL GEORGE B. KELEZ

By Robert R. French*

ABSTRACT

The U. S. Bureau of Commercial Fisheries Biological Laboratory in Seattle acquired a Navy surplus vessel, T-AKL-30, and converted it to a fisheries research vessel during the spring and summer of 1962. The major conversion work consisted of installing bulwarks; replacing the existing gyrocompass, steering engine, and radio with new installations; and overhauling the machinery. The electrical and refrigeration systems were the most troublesome problems encountered during the reactivation. The conversion process took approximately $4\frac{1}{2}$ months, and cost about \$100,000.

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SUMMARY AND CONCLUSIONS

The Seattle Biological Laboratory acquired a Navy surplus vessel T-AKL-30 and converted it into a research vessel during the spring and summer of 1962. The activation and conversion process took some $4\frac{1}{2}$ months at a cost of about \$100,000.

Most of the conversion work was accomplished by the ship's crew. New equipment was purchased and installed. Specialized work on the electrical and refrigeration systems was done by reputable business firms.



Fig. 1 - Bureau of Commercial Fisheries research vessel (George B. Kelez), before (left) and after conversion (right).

The most troublesome reactivation problems were in the electrical and refrigeration systems. Those systems were placed into operating condition for the first cruise but additional work will be required. Other factors were to rebuild the aft crew quarters, construct captain's quarters in the radio room, and a cook's room in the space previously allotted as the crew's wardroom. Finally, fishing and oceanographic equipment were installed on deck.

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This program of acquiring and converting a Navy surplus vessel gave the Seattle Laboratory a serviceable research vessel for carrying on its marine research program in a comparatively short time and at comparatively low cost. Fishing stations were fished as scheduled during the summer of 1962 under the International North Pacific Fisheries Commission program, and in every respect the vessel matched or exceeded performances of chartered research vessels.

BACKGROUND

The key to a comprehensive marine research program is a well-equipped ocean-going research vessel. The Bureau's Fisheries Biological Laboratory, Seattle, Wash., since 1955 has engaged in high-seas research on salmon in North Pacific and Bering Sea waters. Having no research vessel, the Seattle Laboratory chartered commercial fishing vessels for fishing surveys and oceanographic sampling. Costs of those chartered vessels, with crews, in recent years ranged from \$500 to \$800 a day. Although chartered vessels served capably in the research program, they frequently were lacking in gear-carrying capacity and range. There also were some handicaps because of the lack of permanently installed research equipment and facilities. To meet increasing requirements in range and research capabilities, a surplus Navy T-AKL-30 was acquired and converted. The vessel was named the George B. Kelez in honor of a Bureau scientist long associated with the fisheries of Alaska and the Pacific Northwest.

This report describes the reactivation and conversion of the Navy surplus vessel to a research vessel (George B. Kelez) in the spring and summer of 1962. The vessel before and after conversion is shown in figure 1.

VESSEL ACQUISITION AND DESCRIPTION

During the summer of 1961, the Seattle Biological Laboratory seriously considered acquiring for marine research a Navy vessel declared excess property at Mare Island, Calif. Some years previously, similar surplus vessels were inspected but no action was taken to obtain one. Impetus was later given to obtaining a surplus vessel for research because of the need to expand marine research and to provide specialized equipment and permanent facilities not available on chartered vessels. There was further encouragement in considering the Navy vessel for the Laboratory's needs following the chartering and successful fishing by the Bertha Ann, a 176-foot converted Navy surplus vessel, during the summer of 1961.

During September 1961, the T-AKL-30 (formerly FS 400) was declared excess property at Mare Island, Calif. This vessel was nearly identical to the Bertha Ann. Initial examination of the vessel was made by Laboratory personnel and later the vessel was moved from Mare Island to Oakland and drydocked for a more thorough inspection by marine surveyors engaged by the Laboratory. Following receipt of the marine survey report, which in effect stated that if recommended overhaul work was carried out the vessel would be a worthy asset to the Bureau, the Laboratory proceeded to acquire the vessel. This was accomplished late in December 1961. The vessel was then towed to Seattle in early February 1962 for reactivation.

The table gives the particulars of the vessel.

Particulars of the Vessel	
Name	T-AKL-30
Type	Amy F. S., Interisland Supply Vessel.
Built	Ingalls Shipbuilding Corp., Alabama--1944.
Cost	\$1,440,000 (exclusive of the cost of conversion and outfitting as a reefer vessel in 1943).
Construction . . .	Steel
Gross Tons	550
Length	176 feet 6 inches
Beam	32 feet
Light draft	4 feet 6 inches forward; 8 feet 4 inches aft.
Loaded draft . . .	8 feet 10 inches forward; 11 feet 8 inches aft.
General arrangement . .	Raised forecandle head, 2 cargo hatches amidship, superstructure and engine room aft
Main engines . . .	Two 6-cylinder Model 6-278A General Motors Diesels driving two 4-bladed 6' x 6.53' propellers through reversible air-flex couplings and Falk 3.05 to 1 reduction gears. Total horsepower--1,000.
Auxiliary power . .	All auxiliary equipment, including windlass, 4 cargo winches, capstan, and refrigeration equipment, electrically driven. Electric power supplied by 2 100 kw. generators driven by 2 Model 3-267A General Motors Diesels.
Cruising speed . . .	Light, 11.4 knots. Loaded, 10.2 knots.
Fuel capacity . . .	595 barrels (24,990 gals.)
Fresh water capacity	108 long tons
Cruising radius . . .	Approximately 3,000 statute miles.
Average daily . . .	fuel consumption
	25.7 barrels (1,079 gals.)

VESSEL REACTIVATION AND CONVERSION DETAILS

To reactivate the vessel the Laboratory hired a permanent crew to do as much of the work as possible. Work that could not be done by the ship's crew was to be contracted. Accordingly, an initial crew of nine (master, mate, chief engineer, first assistant and second assistant engineers, cook-steward, and three skilled fishermen) were hired. Later a fourth skilled fisherman was hired to complete the crew. Additional temporary workers, such as a welder, carpenter, and engineers were hired for special jobs that the crew could not handle.

Initially, little modification of the vessel was planned. Other than reactivating the ship's machinery, it was planned to convert the radio room to the captain's quarters, install well-deck bulwarks, modify the existing aft crews' quarters for laboratory space, and refurbish various staterooms as necessary to accommodate the crew and scientific personnel. Special fishing and oceanographic equipment were to be installed on deck areas. As the reactivation work progressed, changes were made in the original plans and many additional modifications were accomplished during the vessel conversion.

HULL STRUCTURES, FITTINGS, AND AUXILIARIES: No major hull structure modifications were made on the vessel in preparing it for the initial fishing cruise. The vessel was drydocked for inspection and to clean and paint the bottom, remove coffer dams from sea suction and overboard discharges, and remove blanks from the fathometer. Rubber boots were removed from the tail shafts, and tail shaft clearances were checked. The tail shafts were not pulled during this drydocking, however. The stuffing boxes and rudder stock were repacked, and zincs were renewed.

A new slave-rudder system was installed to provide better vessel control at slow speeds. This system consisted of two auxiliary rudders attached parallel to the existing rudder. These two auxiliary rudders extended out from the main rudder so as to be in the edge of the slipstream from the ship's propellers. Because of its apparent successful adaptation on the Bertha Ann, a slave-rudder assembly was purchased.

The mast and four booms were left as they were and new rigging installed. To raise and lower the booms, four Olympic hoists of 5-ton capacity were installed. These hoists are operated either by hand (rotating a large wheel), or by using a one-half inch heavy-duty electric drill. The electric drill was modified with a special chuck designed to fit the spline of the hoist.

The vessel was equipped with four electric cargo winches which were left in place and used as originally installed after checking out and making repairs. Both cargo hatches, with minor exceptions, were left as they were. On the Number 1, or forward hatch, a booby hatch was installed to provide quick and easy access in and out of the hold. New canvas hatch covers were purchased and new metal strongbacks provided. Freezer plates were installed in the Number 1 hold.

It was initially decided that bulwarks along the well deck and around the stern of the vessel would be necessary to insure safer fishing and oceanographic operations. The new bulwarks were 42 inches high and were molded to the forecastle. They joined the existing bulwarks of the house area (fig. 1).

Other hull auxiliary equipment such as the anchor windlass, anchor chains, ground tackle, boat winch, capstan, etc., were retained as they were, after first checking them out and making minor repairs.

Two access ladders leading from the port and starboard passageways to the boat deck were installed to provide easy access from the boat deck to the weather deck.

A complete check-out of the fire-fighting equipment was made and equipment renewed as required.

A new motor launch was provided as a lifeboat in place of the vessel's oar-propelled boat. It was necessary to obtain boat davits for the new lifeboat, since davits were not on the vessel when acquired.

QUARTERS AND ACCOMMODATIONS: One of the first tasks in activating the vessel was to design and construct the captain's quarters on the bridge level aft of the wheelhouse, since quarters were not provided there in the original design of the vessel. It was believed necessary on a research vessel to have the captain readily available at all times. In order to construct the captain's quarters, the radio was dismantled and removed from the radio room, located aft of the wheelhouse on the port side, and a bunk, drawers, closet, desk, and sink were provided. This room opens directly into the wheelhouse and provides convenient and easily accessible quarters for the captain. Two of the 6 superstructure's staterooms were remodeled by building new bunks and installing sinks. These were for the mate and the chief engineer. A new stateroom for the cook was constructed in the former crew's mess area aft of the galley. The remaining staterooms were assigned as biologists' quarters and as laboratory space. Little was done to these other staterooms other than the necessary cleaning and painting. In addition to the staterooms located in the superstructure, there are crew's quarters located below deck aft of the engine room and in the forecastle. Not wishing to utilize the forecastle for crew's quarters for the time being, this area was left as it was to be used for miscellaneous storage. The crew's quarters below deck were completely rebuilt. Two rooms, 1 with 4 bunks and 1 with 2 bunks, were constructed to provide quarters for 6 crewmen.

MACHINERY INSTALLATIONS: From the general appearance of the engine room and from information obtained in the pre-inactivation inspection report prepared by the U. S. Navy, it was anticipated that engine room work would be confined mainly to cleaning the engines and other machinery. Much more work actually was necessary to activate the machinery in the engine room, and a crew of 3 to 6 men spent the entire work period of about 4½ months overhauling the machinery. Tools were purchased for the engine room and for other uses, since none were aboard the vessel upon acquisition.

The two main engines were completely torn down for cleaning and inspection. Upon re-assembly, all seals, gaskets, and rings were renewed, and all bearings and clearances were checked. Liners were replaced where needed. Contracts were awarded for the overhaul of the blower assemblies of the 2 main engines and the 2 auxiliaries, and for the governors and injectors, as the engineering crew had neither the time nor facilities to do the work.

The two auxiliary engines were disassembled for complete cleaning. The seals, rings, liners, and gaskets were renewed. It was also found necessary to replace all main bearings on the starboard auxiliary engine. The ship's two air compressors were completely overhauled.

The heat exchangers in the main engines and auxiliaries were cleaned and tested. All pumps were checked and packing and gaskets renewed. All manifolds and valves were repacked, reground, and new gaskets installed. Blanks were removed and much of the piping was replaced. The salt-water return pipe from the port-engine cooling system was cracked and had to be replaced. The boiler system was cleaned and checked.

It was necessary to replace the alarm switches for the main engines and auxiliaries. Many motors and other electrical parts were in poor condition and were either repaired or replaced.

It was found necessary to replace flush valves in the sanitary system and to rebuild the sanitary pump. A new fresh-water pump was installed. A portable water tank located in the reefer compressor room was converted to a lube-oil storage tank. Piping and a pump were installed to bring the oil to the engine room.

Most of this work was accomplished from March 15 to July 9, 1962. During July 16-20, the auxiliaries and main engines were tested and declared in operating condition.

ELECTRICAL SYSTEM: The check-out and repair of the electrical system was probably the most serious problem encountered in reactivating the vessel. The long lay-up period may have caused the deterioration of the electrical system. A complete check-out of the electrical system by a professional firm was necessary. Breakdowns of various equipment and delays in reactivating the machinery continually developed until the electrical system could be completely checked out and restored to operating condition. For example, it was necessary to check out all motors on the vessel and to replace many brushes and bearings. Many motors, such as the cargo winch motors, were found to be improperly tagged, and wiring had to be traced before it could be hooked up and the motors tested. It was also found that the fans to both the engineroom and reefer-compressor room were reversed, and had to be changed.

In summary, the electrical system was found to be in generally poor condition and a great deal of time and labor was necessary to repair it. Electrical problems in the steering, boiler, and navigational systems developed during the first fishing cruise, and additional work was found necessary.

NAVIGATIONAL INSTALLATIONS: Several navigational installations, both new and repaired, were accomplished while activating the vessel. Some, such as the gyrocompass and steering engine, were not anticipated at the time of the initial vessel inspection. Subsequent inspection of the equipment indicated that new equipment would be necessary. Following are summary accounts of navigational installations made aboard the George B. Kelez:

GYROCOMPASS: The vessel came equipped with a Mark XVIII Sperry gyrocompass. This instrument was not considered by the manufacturer's representatives to be a satisfactory model for our needs. It was replaced with a Sperry Mark XIV gyrocompass. Installation was made by an electrical firm under supervision of the Sperry Company.

STEERING ENGINE: The vessel was equipped with an electric steering engine for steering control. Marine experts stated that this particular model engine had a history of unsatisfactory operations on similar vessels. It was therefore believed advisable to replace it. The replacement was a Sperry No. 1 steering engine system. Installation was accomplished by a shipyard under supervision of the Sperry Company.

AUTOPILOT: The vessel, when acquired, was not equipped with an autopilot. Since this feature was considered essential, much study was given to the question of an adequate autopilot system for the vessel. Marine surveyors, the marine industry, and vessel owners were consulted regarding the best system that should be installed. In the interest of availability, time for acquisition, and cost, it was decided to get an autopilot working through the magnetic compass. A Sperry autopilot system with this feature was obtained and installed by an electrical firm under supervision of the Sperry Company. A remote-control unit was also installed.

COMMUNICATIONS AND ELECTRONICS INSTALLATIONS: The following sections summarize the communications and electronic installations that were accomplished in activating the George B. Kelez:

RADAR: The vessel came equipped with an AN-STN-5 radar, also known as the commercial model CR-101-A manufactured by the Radiomarine Corporation of America. The radar consists of 4 units: transmitter-receiver, indicator, motor-generator, and antenna. This instrument was checked out and put into operating condition.

LORAN: The loran on the vessel was an AN/SP-7, manufactured by Sperry Gyroscope Company. This instrument was checked out and put into operating condition. A second loran was also acquired (the same model), and installed as a spare set.

RADIO: At the time of acquisition, the vessel was equipped with a MacKay model MRU-10-11-13 radio unit. This was primarily a CW set and required an operator with a first-class radio license. Since it was not planned to carry a first-class licensed radio operator aboard the vessel, and since it was planned to convert the radio room to captain's quarters,

the MacKay radio was removed and a new MW-3 HST marine radiotelephone was installed in the chartroom. A 65-watt auxiliary radio set was also placed in the pilot house.

RADIO DIRECTION FINDER: The existing Bludworth radio direction finder was replaced with a new Apelco radio direction-finder receiver. This was adapted for use with the existing loop antenna and indicator unit.

SONAR FACILITIES: The vessel came equipped with a model NJ-8 fathometer consisting of a receiver indicator and switching unit, and a receiver-recorder. These units were left intact and placed into operating condition during the reactivation period.

ENGINE CONTROL: Originally, engine control was accomplished by port and starboard engine order-telegraph. This system was retained and put into operating condition. The existing electric engine controls in the vessel were replaced with a Westinghouse air-control system. Controls were installed in the wheelhouse and on the port and starboard openbridges. The installation of the air-control system was accomplished by the vessel's crew under the supervision of air-control specialists.

REFRIGERATION: The vessel is equipped with two compressors of 25-ton capacity each, manufactured by Frick, for cargo refrigeration use. The plan for the vessel was to refrigerate the No. 1, or forward hold, for freezing and holding fish samples from high-seas fishing operations. A great deal of difficulty was experienced with both compressors and with the electrical controllers while reactivating the refrigeration system. It developed that there was insufficient time to get both units operating, therefore, for the first cruise, only one compressor unit was operated. This unit kept the No. 1 hold at a temperature between 0° and -10° F. during the entire cruise. Plans are to ultimately install a new refrigeration system for the No. 1 hold.

Two compressors of one-half ton capacity each, manufactured by York, were initially installed for ship's use--the chill room and freezer room. These two compressors were checked and put into operation. The refrigerator in the galley was checked out and put into operation.

MISCELLANEOUS EQUIPMENT AND SUPPLIES: As final preparations before sailing, and following reactivation of the machinery, it was necessary to purchase miscellaneous equipment and supplies. A partial list of the items included sextants, a chronometer, polaris, bedding and mattresses, galley and ward-room supplies, mooring lines, a lifeboat cover, and sheave blocks.

For ballast, about 60 tons of concrete blocks was obtained and placed in the No. 2 hold.

RESEARCH EQUIPMENT INSTALLATIONS: Because time was an important element in reactivating the vessel, a minimum amount of research equipment was installed for the first fishing cruise. The research equipment consisted of two categories--fishing and oceanographic equipment.

FISHING EQUIPMENT: Equipment for salmon gill-net fishing was installed for the initial cruise. This consisted of a hydraulically-powered gurdy, a net roller, net box, and net chute. The gurdy and roller were of the design previously used in shark fishing, and were easily adapted for salmon fishing on this vessel (fig. 2). The motor and controller for the hydraulic system were placed



Fig. 2 - Gurdy and rail net roller as adapted on the George B. Keler.

in the reefer compressor room, and the gurdy was located on deck between the two starboard cargo winches.



Fig. 3 - Setting gill nets from George B. Kelez. (Left--nets passing along net chute on boat deck; right--nets dropping off stern end of net chute.)

The net box was placed along the starboard bulwarks just aft of the gurdy. This offered a convenient arrangement for hauling and piling the nets and for laying out damaged nets on the No. 2 hatch cover for later repair. A net chute running the length of the boat deck to the stern was connected to the after end of the net box. By this arrangement, gill nets were set off the stern with a minimum of effort. Net setting and hauling operations are illustrated in figures 3 and 4, respectively.



Fig. 4 - Hauling nets aboard George B. Kelez.

OCEANOGRAPHIC EQUIPMENT: For the first cruise, oceanographic equipment installed consisted of a hydraulically-operated "A" frame and hydrographic winch (fig. 5). The same motor and controller used as



Fig. 5 - Winch and "A" frame arrangement used for oceanographic sampling on the George B. Kelez.

the prime mover for the gurdy supplies the power for the "A" frame and winch.

COST OF REACTIVATION

The cost for the reactivation and conversion of the George B. Kelez amounted to approximately \$100,000. That amount included the cost of drydocking and inspection in Oakland, the cost of towing the vessel from Oakland to Seattle, and the crew's salary up to the time the vessel was ready to depart. The cost was fairly close to the original estimate of about \$85,000. The increase was due primarily to the necessity for replacement of the steering engine and gyrocompass and large expenses in refurbishing the electrical and refrigeration systems, all of which had not been anticipated. The unanticipated costs resulted from the poor condition of that equipment and involved unexpected labor and material costs.

It is believed that the acquisition and activation of a research vessel of the size and capabilities of the George B. Kelez for \$100,000 is well worth the money spent, bearing in mind that the vessel cost \$1,440,000 to build in 1944, exclusive of refrigeration costs, and that similar vessels cost considerably more today.

PERFORMANCE

A shake-down cruise prior to embarking on a research cruise in northern waters was originally planned, but time was not available if the fishing survey schedule was to be met. The vessel, therefore, departed Seattle for the fishing grounds the day it was ready. The route to the fishing area in the western part of the Gulf of Alaska was via Ketchikan and Kodiak, where stops were made to make necessary adjustments.

The over-all performance of the vessel was up to expectations. Some mechanical trouble developed in the electrical and navigational systems and in the fresh-water pumping system during the cruise. These were not serious enough to hinder the research operations.

During the first cruise, 23 fishing stations were occupied in the western Gulf of Alaska. The vessel performed very capably during the fishing operations. Setting and hauling the gear was easily handled with the large vessel. The large deck and hold areas provided ample room for the repair and storage of gill nets. Damaged sections of gear were laid aside on the deck during net hauling for later repair. The vessel's cruising speed of about 11.5 knots per hour was an asset in reducing running time to and from ports and between fishing stations.

On the whole, the vessel performed very satisfactorily during the initial cruise and is an asset to the Bureau's marine research program.



Created in 1849, the Department of the Interior—America's Department of Natural Resources—is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States—now and in the future.



TRENDS AND DEVELOPMENTS

Alaska

SOVIET AND JAPANESE FISHERIES IN GULF OF ALASKA:

About 180 fishing and related support vessels of the Soviets in May 1963 had shifted their major efforts from the winter grounds in the Bering Sea into the Gulf of Alaska. Japanese fishing efforts increased markedly during May 1963, with about 180 vessels in the eastern Bering Sea and North Pacific Ocean.

The maximum Soviet fishing effort in the Gulf of Alaska occurred in early May when a fleet of about 150 vessels began operations in the waters southwest of Kodiak Island. That fleet composed of well over 100 conventional SRT-type trawlers, up to 12 stern-ramp factory trawlers, and accompanying processing and support vessels progressed northeasterly generally along the 100-fathom curve and was centered on the Portlock Bank area east of Kodiak. Observations indicated the Soviets were again trawling primarily for Pacific ocean perch as they did in 1962.

Claims of the Japanese that the king crab stocks near the Port Moller area may have been depleted appear to be somewhat refuted by the more recent Soviet king crab fishery in that area. In 1962, the ultramodern 15,000-gross-ton processing vessels Andrei Zakharov and Pavel Chebotnyagin operated for king crab in that area. This year the Zakharov (built in 1960) and the Chebotnyagin (completed in 1962) were joined by their sister-ship Eugeny Nikishin (also completed in 1962). Those factoryships were each served by two SRT trawlers which set the tangle nets. The nets were later picked up by 1 of the 12 picker boats that are carried in davits on each factoryship.

Soviet whaling efforts have also been increased in 1963 by the addition of a second whale factoryship and presumably accompanying catcher vessels. The Alew, a former United

States ship converted to whale processing, has operated in that area for several years. This year she was again present and was joined by the new 17,600-gross-ton Vladivostok. Both fleets began operating in the western Aleutians area but about May, the Vladivostok fleet moved into the area southwest of Kodiak Island. The Aleut fleet remained in the central to western Aleutian Islands region.

The 1963 Japanese fisheries in the eastern Bering Sea generally followed the pattern of the past several years with a reduction in fleet strength from the 1962 levels.

Of perhaps primary interest are the Japanese long-line fleets operating in the "tri-angle" area of the Bering Sea. The total strength of that fishery was reported to be 5 processing "motherships" accompanied by 66 catcher vessels.

Shrimp fisheries were being conducted by the Japanese in the general area north and west of the Pribilof Islands with 2 processing ships and 26 accompanying catcher boats. A Japanese tangle-net fishery for king crab was centered in the Port Moller region and included 2 processing motherships and about 20 catcher vessels. The fish-meal and oil operations were reduced to one mothership with 30 trawlers from the 4 mothership operations in 1962. Fish meal activities have been localized in the region northwest of Unimak Pass. As of May, there was no knowledge of Japanese whaling efforts.

1963 BERING SEA HALIBUT CATCH:

The catch of halibut in the eastern Bering Sea quota area had reached 9.2 million pounds, according to an announcement by the International Pacific Halibut Commission on May 29, 1963. This included a United States catch of 3.2 million pounds, a Canadian catch of 4.6 million pounds, and a Japanese catch of 1.4 million pounds. In 1963, the recommended

quota for the area is 11.0 million pounds. United States and Canadian fishing activity in the area was virtually over by the end of May due to the opening of the season south of the Aleutian Chain. Japan was expected to take the greater part of the remaining 1.8 million pounds of the Bering Sea quota.

YAKUTAT AREA GOOD PRODUCER OF DUNGENESS CRAB:

Three vessels delivering Dungeness crabs to a canning company at Yakutat were doing quite well as of the end of May. The Tana, largest of the vessels, unloaded nearly 13,000 pounds of crabs after a two-day trip. The vessel was fishing with the legal limit of 300 pots. The fishermen were guaranteed not less than 9 cents a pound for the live crabs at the cannery.

KODIAK AREA KING CRAB LANDINGS LIGHT:

There was very little commercial fishing for king crab during May, although tags from marked king crabs continued to arrive at the Auke Bay Biological Laboratory. They were mostly from the Kodiak area and included crabs that were caught during March.

CONTINUED INTEREST IN TANNER CRAB PROCESSING:

There is continued interest in the development of a tanner crab fishery in Alaska. Several firms have requested information on the fishery and have processed limited quantities of the species during the past winter. One firm plans to pack at least 2,000 pounds of tanner crabs for market acceptance tests this coming season.

YAKUTAT CANNERY HAS DIVERSIFIED OPERATIONS:

A fish-canning plant at Yakutat has been seeking ways to diversify its production. Although the firm traditionally subsisted on salmon production, the decline in availability of fish prompted their interest in other resources. Production of cooked Dungeness crabs was successful during the 1962 season and was being continued in May 1963. Experimental pot fishing for spot shrimp and king

crab was also being conducted. Active interest was also being shown in shrimp trawling and scallop potentials of the area.

RESTAURANTS AND MARKETS REQUIRED TO REPORT FRESH FISH PURCHASES:

Restaurants, meat markets, grocery stores, and similar establishments in Alaska which buy fish or shellfish directly from commercial fishermen for resale to the general public are subject to a new regulation which requires in part that primary buyers of fish or shellfish issue a fish ticket to the commercial fishermen for each purchase made. Protection Officers of the Alaska Department of Fish and Game have been contacting markets and restaurants to explain the procedure, and supply fish ticket books.

AUKE BAY FEDERAL FISHERIES BIOLOGICAL LABORATORY COOPERATES WITH STATE ON RESEARCH:

A U. S. Bureau of Commercial Fisheries biological laboratory at Auke Bay, Alaska, built in 1960 at a cost of \$600,000 by the U. S. Department of the Interior and with an annual budget of about \$1.2 million, is the center of a far-flung fisheries research program in Alaska. Much of the research is done in co-operation with the State of Alaska.

Alaska's fish and shellfish catch in 1962 was worth \$48 million at dockside and \$126 million at the processor level.



Architect's sketch of the U. S. Bureau of Commercial Fisheries Auke Bay Biological Laboratory.

Studies by the Laboratory range from research on the possible effects of the proposed Rampart Dam on the world's longest salmon

run on the Yukon River to life history studies of Alaska's popular cocktail shrimp. The Yukon River salmon run (2,000 miles long) is important as a source of food and income for natives who live on or near the river.

The Laboratory has a staff of 35 scientists and 15 clerks and technical aides. Seasonal workers, most of them student biologists, help with field examinations. Recently, as many as 100 such workers were employed on one project in one season.

The Laboratory site was chosen because of its ideal location. It is between freshwater Auke Lake and salt-water Auke Bay, making possible a great variety of studies on the effect of salinity changes on salmon during various stages of the life cycle. It is adjacent to Juneau and accessible by sea and air. The Laboratory is being equipped to test field situations under controlled conditions. Basic research is conducted on hering, king crab, shrimp, the five species of salmon (red, chum, coho, pink, and king), and on the food and predatory species associated with them. Physical environmental studies on lakes, streams, and the ocean itself are part of the program.

Scientific studies include the long-established fisheries biological programs at Little Port Walter and at Karluk and Brooks Lakes, and at the newer projects at Kasitsna Bay, Olsen Bay, Traitors Cove, Naknek River, Hollis, Old Tom's Creek, Yukon River, Wood River, and Kvichak. The studies at Hollis, Wood River, and Kvichak are under contract to the Fisheries Research Institute of the University of Washington.

The Little Port Walter research station includes 2,500 acres of watershed being held in natural state so environmental changes made by nature, not man, can be studied and their effect upon the survival and reproduction of salmon studied.

The largest single program is the Bristol Bay red salmon research, with headquarters at the town of King Salmon. Some 100 seasonal workers have been engaged in studies designed to understand red salmon problems and predict the runs. At Karluk Lake, on Kodiak Island, other red salmon studies are being pursued. Red salmon generally spend two years in inland lakes before making their pilgrimage to sea and Karluk Lake offers an excellent opportunity to study the environmental effect on the growth and survival of young fish.

The biology of shrimp and king crab is studied at Kasitsna Bay, across from Homer on Cook Inlet. Olsen Bay, 40 miles from Cordova, is the site of research on salmon which have shown a preference to spawn in the intertidal sections of streams rather than run up towards headwaters as is customary; at Traitors Cove is the principal chum salmon research station where the effects of temperature, predation, competition for food, flooding, and other environmental factors on survival and growth of salmon in freshwater are investigated.

At Old Tom's Creek, near Ketchikan, the U. S. Bureau of Commercial Fisheries and the Forest Service are jointly studying the effects of pesticides upon fish life. At Hollis, near Ketchikan, the Fisheries Research Institute is investigating the effects of logging upon a salmon fishery.

The Auke Bay Laboratory is a two-story structure with facilities for red salmon studies, ocean studies, biometrics, and river salmon research. It is equipped with an aquarium laboratory, a library, a museum, and conference rooms. There are also dock and warehouse facilities.

In addition to the Auke Bay Laboratory and its field stations, the U. S. Bureau of Commercial Fisheries has regional offices at Juneau and a technological laboratory at Ketchikan.



Alaska Exploratory Fishery Program

DISTRIBUTION AND ABUNDANCE OF SEA SCALLOPS IN GULF OF ALASKA STUDIED:

M/V "John R. Manning" Cruise 63-1 (May 20-June 14, 1963): Large scallops (*Patinopecten caurinus*) were caught in the waters of the Gulf of Alaska during an exploratory fishing cruise conducted by the U. S. Bureau of Commercial Fisheries vessel John R. Manning.

Eastern-style scallop dredges were employed at 82 locations between Cape Saint Elias and Lituya Bay in the waters of the Gulf of Alaska and Yakutat Bay. Catches of up to 7 bushels of scallops per 30-minute drag were made using an 8-foot dredge, identical with the type used in the scallop fishery

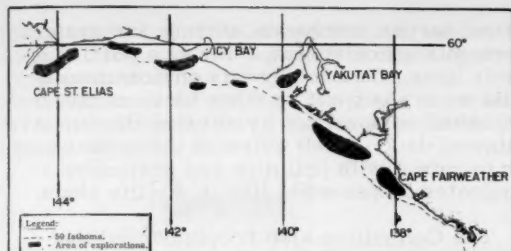


Fig. 1 - M/V John R. Manning Cruise 63-1 (May 20-June 14, 1963).

of the Northwest Atlantic. Depths between 20 and 90 fathoms were sampled to gather preliminary information on the distribution and abundance of the scallop in the Gulf of Alaska.

Scallops were taken at the following locations: off Cape Fairweather at depths from 34-42 fathoms, off Icy Bay in 39-44 fathoms, and east of Cape Saint Elias where catches were taken between 54 and 56 fathoms.



Fig. 2 - Eight-foot scallop dredge used aboard John R. Manning during Cruise 63-1. The inside diameter of the rings is three inches.

East of Yakutat Bay, the size of scallops measured ranged from $2\frac{3}{4}$ to $6\frac{1}{2}$ inches. Of those, 73 percent were between 3 and 4 inches (measured from the hinge to the outer margin

of the shell). West of Yakutat Bay, the size range was from 3 to 7 inches with 82 percent of the scallops falling between 5 and $6\frac{1}{2}$ inches. The edible (muscle) portion of the scallops varied from 15 to 60 count per pint measure. The yield of meats varied from 2 to 5 pints for each bushel of whole live scallops. The meats of the large size scallops were slightly yellow in color.

About 650 pounds of shrimp were caught in a single 60-minute drag with a small shrimp trawl off Knight Island in Yakutat Bay. About 90 percent of the shrimp catch was the side-stripe variety (*Pandalopsis dispar*); the remainder consisted of coon stripe (*Pandalus hypsinothus*), spot (*Pandalus platyceros*), and pink shrimp (*Pandalus borealis*).



Alaska Fisheries Investigations

EVIDENCE OF SEPARATE PINK SALMON INTERTIDAL RACES:

Length measurements from 1,075 pink salmon measured in 1962 revealed that spawners in the intertidal tributaries of Olsen Creek again were significantly smaller than mainstream spawners. The consistent segregation of small fish to certain portions of Olsen Creek intertidal spawning grounds indicates the possibility of separate genetic stocks, and plans are under way to verify whether separate races do occur in such close proximity.

PINK EGGS WARMED BY INTERTIDAL ACTION:

The photographic record was read of in-travel water temperatures in the Olsen Creek intertidal area October 20, 1962, to March 12, 1963. Mechanical operation of the "Braincon" instrument clockwork and film advance mechanism was flawless for the five-month period. Temperature fluctuations associated with tides and weather changes corresponded closely with actual time of those occurrences as calibrated from tide prediction tables. Horizontal reference lines, representing degrees of temperature did not appear on the film as advertised, but the film was read by use of a scale established by calibration. According to the film record, salmon eggs last winter at the 10.5-foot tide level were subject to 234 day-degrees centigrade, of which 27 day-degrees centigrade were a

result of warming action by tides. As far as is known, this is the first time significant data of that type have been obtained, and it is a start on determining what environmental conditions are conducive to maximum survival of intertidal pink salmon.

BRISTOL BAY FRY AND SMOLT MIGRATIONS FAVORABLE:

By late May 1963, the smolt index on the Ugashik River reached 200,000, indicating a sizable smolt migration. The Hidden Creek fry outmigration was near the 300,000 mark, indicating a survival from potential egg deposition of over 10 percent. A generally moderate winter with good water flow likely contributed a great deal to this relatively high survival.

AUKE BAY PLANKTON INCREASES:

Day and night samples taken in Auke Bay during late May, showed considerable seasonal increase in zooplankton. Again, this coincides with the outmigration of pink fry from Auke Creek. Day samples average around 5,000 organisms, with some samples going as high as 14,000 per haul. The principal organism is barnacle larvae (*Balanus* sp.). Larval crabs, shrimp, and fish have increased in numbers. Some fish eggs have been tentatively identified as those of the walleye pollock. Some night samples have contained 40 to 60 thousand organisms, principally euphausiids.



American Fisheries Advisory Committee

PROTECTION OF ESTUARIES RECOMMENDED:

Protection of estuaries essential as spawning grounds and nursery areas for valuable fisheries and recognition of the joint interest of sport and commercial fishermen in pesticides and pesticide research were stressed by the American Fisheries Advisory Committee at its June 1963 meeting in Washington, D. C.

In discussing estuaries, committee members pointed out that many important fisheries depend upon inshore brackish water environment. Gray sea trout (weakfish),

drum, tarpon, menhaden, shrimp, and oysters seek this brackish water during a portion of their lives. To destroy this environment by fills or to change it by dikes or to modify the chemical composition by altering the enriched, mineral-laden fresh water or the ocean water or to ruin it with pollution and pesticides eliminates an essential link in the life chain.

The Committee also recommended that there be continued improvement in the quality of fishery products offered to the consumer, that there be an increase in the research and exploratory efforts on bluefin tuna and swordfish in the Atlantic Ocean, and that the commercial fishing values of large reservoirs be studied.

The American Fisheries Advisory Committee, a group of 20 fisheries experts selected by the Secretary of the Interior, was established under the Saltonstall-Kennedy Act of 1954. This law provides for research and educational programs which will improve the economic status of the domestic fishing industry and make valuable protein from the sea more readily available to the consumer. The law is administered by the U. S. Bureau of Commercial Fisheries.

In speaking to the group, Senator Leverett Saltonstall (Mass.), co-author of the Saltonstall-Kennedy Act, urged studies of the effect of water pollution upon marine life, development of underutilized resources as a possible solution to hunger throughout the world, and modernization of fishing fleets and shore facilities.

Chairman Benjamin Smith, of the United States delegation to the International Convention for the High Seas Fisheries of the North Pacific Ocean, stressed the international aspects of commercial fisheries.

The next meeting of the Committee will be held in Honolulu, Hawaii, January 22-24, 1964.



American Samoa

COMPLETION DATE FOR SECOND TUNA CANNERY DELAYED:

Construction of the second United States tuna cannery at American Samoa is reported to be behind schedule slightly, according to Japanese press reports. The cannery, orig-

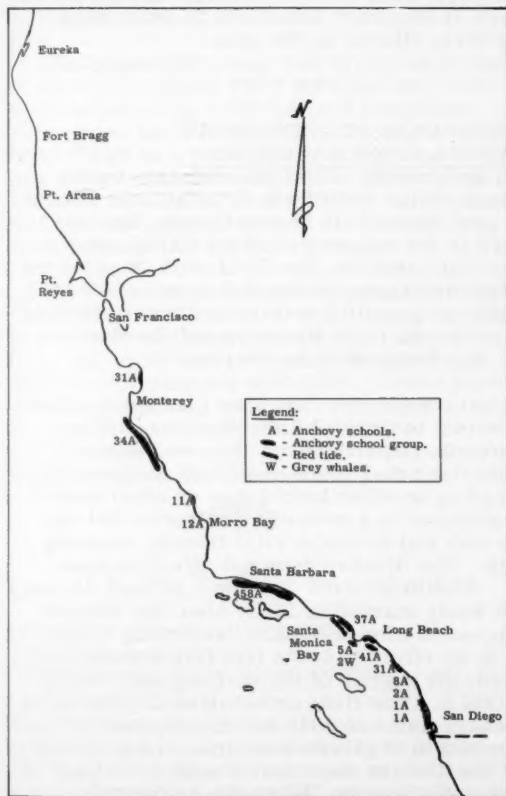
inally scheduled to be in operation in early August 1963, was not expected to begin operating until after the middle of the month. However, the cold-storage plant was expected to be completed in early July as scheduled. (Suisan Tsushin, June 10, 1963.)



California

PELAGIC FISH POPULATION SURVEY CONTINUED:

Airplane Spotting Flight 63-5-Pelagic Fish (May 13-15, 1963): To determine the inshore distribution and abundance of pelagic fish schools, the inshore area from the United States-Mexican Border to Fort Bragg, Calif., was surveyed by the California Department of Fish and Game's Cessna "182" 9042T.



Pelagic fish survey flight 63-5.

Weather and visibility conditions were generally good and the entire survey area was covered.

The flight was successful in that schools of anchovies were observed along the Monterey County coast from Pt. Sur to Piedras Blancas. Fish schools seldom are sighted in this area.

The school groups along the southern California coast were extensive. The group at Santa Barbara extended almost continuously from Gaviota to Rincon Point. One school in Santa Monica Bay extended from Santa Monica pier to Playa del Rey, a distance of 4 miles.

Some red water was seen in Santa Monica Bay but it was not nearly as heavy as in past months. The anchovies were schooled between the red tide and the surf. Red tide also was observed in Los Angeles-Long Beach Harbor, off Laguna Beach, and was quite extensive around Oceanside and Mission Beach.

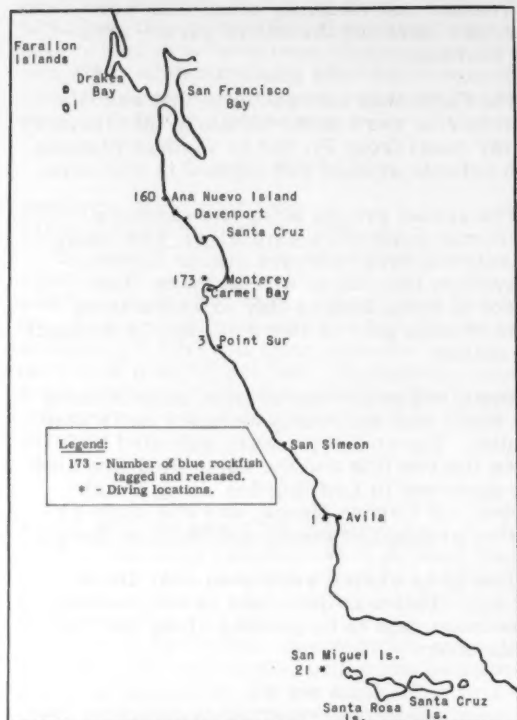
Two grey whales were seen near Point Fermin. This was quite late in the year for those mammals to be passing along the California coast.

BLUE ROCKFISH TAGGED AND BIOLOGICAL DATA COLLECTED OFF MID-COASTAL AREA:

M/V "N. B. Scofield" Cruise 63-S-3 (April 10-May 9, 1963): The objectives of this cruise by the California Department of Fish and Game research vessel N. B. Scofield were: (1) tagging blue rockfish (Sebastes mystinus) for studies of migration; (2) taking blue rockfish stomachs for food analyses; (3) collecting live fish for holding in aquaria for serological studies; (4) taking blood samples for studies of subpopulations; (5) making underwater observations and censuses of fish on reefs; and (6) collecting specimens for Steinhart Aquarium and for taxonomic studies.

Nineteen days were spent fishing in the California coastal area between the Farallon and San Miguel Islands, but 11 other days were lost due to bad weather or in traveling between fishing areas.

Blue rockfish fishing was poor, particularly from Avila to the Farallon Islands. Only 616 fish were caught; 359 of those were tagged and released at sea. A total of 91 blue



Fishing area of M/V N.B. Scofield during Cruise 63-S-3.

rockfish were tagged and delivered alive to three different aquaria for seriological studies. Deflation of the swim bladder was required on 107 of the tagged fish, and 9 of those also required stomach replacement. All blue rockfish tagged were first anesthetized in a solution of one part MS-222 to 15,000 parts of sea water. Blood samples were obtained from 48 fish, and stomach samples were collected from 96.

SCUBA dives were made on reefs at Adams Cove, San Miguel Island; Lion Rock off Avila; Monterey Breakwater; and off Davenport. Estimates of the total numbers of fish by species were made on all reefs except at the Monterey Breakwater. Observations were made of blue rockfish habitat and behavior. When salps (*Salpa* sp.), jellyfish, and other plankton were abundant it was very difficult to catch blue rockfish by hook and line.

Shrimp traps were fished at Cuyler Cove, San Miguel Island, one night and at the Monterey Breakwater for three days and nights

in an attempt to capture juveniles. Two 4-8 inch juvenile rockfish were caught at the Monterey Breakwater.

Several species of juvenile fishes were collected under a nightlight at Año Nuevo Island, Farallon Islands, Drakes Bay, Monterey Bay, and Pfeiffer Point. These fish were retained for taxonomic studies. Ninety-nine live fish were saved for the Steinhart Aquarium.

Most of the live fish had their swim bladders so distended that deflation was necessary. Those not requiring deflation were the swell shark, starry flounder, Pacific sanddab, rock sole, kelp greenling, brown Irish lord, cabezon, lingcod, and sharpnose seaperch. Deflation and replacement of protruding eyes of several quillbacks, rosy, China, canary, and vermilion rockfish was successful in most instances.

Observations were to be made on the survivors at Steinhart Aquarium to determine long-term effects on the eyes.

FISH DISEASE REAPPEARS AT CRYSTAL LAKE HATCHERY:

A recurrence of the fish disease, *Ceratomyxa*, at the California Crystal Lake Hatchery near Burney, in Shasta County, has resulted in the suspension of all fish plants from that hatchery, the California Department of Fish and Game announced in mid-June 1963. Insofar as possible, waters ordinarily stocked from Crystal Lake Hatchery will be planted with fish from other hatcheries.

Past experience indicates that the disease is limited to Crystal Lake Hatchery. The California Department of Fish and Game emphasized that there was little danger of it spreading to other hatcheries or other waters. *Ceratomyxa* is a protozoan parasite that enters fish and destroys vital tissues, causing death. The disease does not affect humans.

A study started in 1962, when the disease reappeared after 13 years, was being continued in an effort to learn how fish become infected, the source of the disease, and how to control it. The first outbreak at Crystal Lake Hatchery came in 1948 and the disease reappeared in 1949. At that time, it was thought that the disease was centralized in the Crystal Lake water supply. When the hatchery's water supply was changed to Rock Creek in

1950, the disease disappeared until 1962.

About 400,000 fish were being raised at the hatchery. A small population of 17,000 trout on a separate water supply did not have the disease and were to be planted in local waters. (California Department of Fish and Game, June 15, 1963.)

INVESTIGATION OF POSSIBLE FISH LOSSES FROM DDT-TREATED IRRIGATION WATER:

A study aimed at controlling conditions which led to fish kills during the spring of 1963 in sloughs north of Sacramento, Calif., was being made by the California Department of Fish and Game in cooperation with State agricultural agencies. It is thought that the fish losses were caused by the discharge of rice irrigation water which had been treated with DDT.

The controlled study was being conducted on three rice fields near Sacramento to determine how long DDT-treated irrigation water must be held on fields before the DDT level drops to a point where water discharges will not be harmful to wildlife. By holding DDT-treated water on the fields, it was hoped that a significant amount of DDT would be settled out of the water.

The University of California Agricultural Extension Service has already recommended to pesticide dealers, salesmen, and applicators that water in rice fields be held for 5 days after treatment with DDT. It was hoped that the new study would provide the basis for agricultural rules in line with the Extension Service's recommendation. (California Department of Fish and Game, June 15, 1963.)



Central Pacific Fisheries Investigations

OCEANIC EDDIES SOUTHWEST OF OAHU SURVEYED:

M/V "Charles H. Gilbert" Cruise 64
(April 9-28, 1963): Great whirlpools in the Pacific Ocean southwest of Oahu, Hawaii, 20 to 50 miles across and revolving at a rate of one turn in 10 days or so, were studied in detail by oceanographers of the U. S. Bureau of Commercial Fisheries on a cruise of the

research vessel Charles H. Gilbert. These ocean eddies are like the swirls seen below rocks in a stream, the rocks in this case being the Hawaiian Islands and the stream the North Pacific Equatorial Current.

The scientific field party began to search down-current from Oahu for signs of the eddies which should theoretically be there. On April 10, in an area about 80 miles southwest of Honolulu, measurements of deep-water temperatures indicated that cold-water layers were bulging up toward the surface as they might be expected to do in the middle of an eddy. Nine drogues were strategically placed across the area, each consisting of an aviator's parachute suspended by a fine nylon line from a float bearing a flagpole, light, and radar reflector. The line on one drogue was made 2,000 feet long, to "anchor" it in the more slowly moving deep water, while the other parachutes were only 60 feet below the surface.

For three days the vessel observed the drogues, plotting their positions as they traced the counterclockwise revolution of the great gyral and its slow total drift to the westward. Fortunately the weather was fine and the area is one where Loran navigation is accurate within one-quarter of a mile. The result is an unprecedentedly fine set of measurements of an eddy in the open sea. The drogues near the outer edge of the gyral whizzed along at about 40 miles a day, while the speed of those nearer the center was only about 10 miles a day. The whole system was moving west at 5 to 8 miles a day.

Revisiting the same area 10 days later, the scientists found that the eddy had been replaced by, or possibly had broken up into, 4 or 5 smaller eddies, forming a pattern of movement too complex to study effectively with drogues.

The observations made on this two-part cruise prove that downstream eddies do exist near oceanic islands and give an accurate idea of the speed at which they may revolve and move. Future experiments of the same type will be aimed at discovering more about the life span of such eddies and the changes of form and speed that they undergo as they develop and then die out.

The attainment of a better knowledge of the behavior of eddies around the Hawaiian Islands will be of immediate value in inter-

preting returns of drift bottles and cards, which the expeditions of the Bureau's Laboratory at Honolulu have been releasing on a large scale over the past two years. In the longer run, the marine scientists hope to be able to study eddies long and intensively enough to discover how they may affect the fisheries, as for example by enriching and concentrating the animal life of the ocean surface.



Fish Behavior

NEW LABORATORY AT UNIVERSITY OF MIAMI TO CONDUCT STUDIES:

The new "fish behavior" building (officially designated Marine Life Controlled Environment Building) now under construction at the Institute of Marine Science, University of Miami, Fla., is a "first" in marine science and is designed specifically for the study of the behavior of marine animals under a variety of conditions. From its laboratories may come answers to many questions that have perplexed anglers and scientists: How and why do fish migrate? How do they navigate? What controls their feeding habits? Why do they prefer different kinds of baits at different times? What attracts and repels sharks? How do whales and porpoises communicate?

The Controlled Environment Building will contain 14,000 square feet of research area and will be equipped with the latest scientific apparatus for studying the behavior of all kinds of living marine organisms from tiny planktonic animals to whales.

Special pressurized tubular tanks 40 feet long will enable researchers to study fishes under simulated conditions of great depth. Water in these tanks will be regulated for temperature, salinity, oxygen, carbon dioxide, and acid-base relationship. Rooftop settling tanks will provide up to 600 gallons of water a minute. The building's design permits live specimens to be transferred from the sea to tanks with maximum safety and a minimum of disturbance. A special elevator will carry them to upper floors. (News of the Institute of Marine Science, June 20, 1963.)



Fisheries Laboratory

CONTRACT AWARDED FOR NEW LABORATORY AT SEATTLE, WASH.:

A \$1,851,000 contract for a new Bureau of Commercial Fisheries Laboratory, library, and conference center in Seattle, Wash., has been awarded by the U. S. Department of the Interior.

The new buildings will be of reinforced concrete and masonry and will be adjacent to the existing fisheries laboratory at 2725 Montlake Boulevard, on the shore of Lake Union. The new structures will relieve overcrowding of the present laboratory which was built in 1931 and which has been the center for biological and technological research, and the base for an extensive exploratory fishing program conducted in the waters off the northwestern States.

The new laboratory building will be 4 stories high and will contain 65,000 square feet of floor space. The library-conference structure will have 3 stories and will provide 17,000 square feet of space. The buildings are to be completed within a year and a half after the work starts.

Research on developing new uses for fish oil and fish-oil derivatives will be one of the projects to be conducted in the technological section of the new laboratory. A water temperature control system will permit biologists to make long-needed studies of the effect of temperature upon the survival of fish eggs, fry, and fingerlings. Better opportunity also will be provided for determining the value of trace elements in the environment, for antibiotic research, and for ecological studies.



Fish Oils

GAS-LIQUID CHROMATOGRAPHY AIDS IN IDENTIFYING FATTY ACIDS:

Research on fish oil fatty acids is aided by gas-liquid chromatography at the Seattle Technological Laboratory of the U. S. Bureau of Commercial Fisheries. This research tool provides information on the constituent fatty acids. Gas-liquid chromatography analyses of oils from 17 species of edible fish have been completed. The analyses of six additional oils will complete the present study.

Results of those analyses of extracted oils showed marked similarity of the fatty acid distributions between salt- and fresh-water fish and shellfish. A few major differences in amounts of specific fatty acids were noted, for example in Pacific herring, chinook, salmon, and sea scallops.



Fish Protein Concentrate

CONTRACTS AWARDED FOR EXPANDED RESEARCH PROGRAM:

Contract awards from funds made available to the U. S. Bureau of Commercial Fisheries for research on fish protein concentrate (FPC) are as follows:

Texas A & M College, two contracts totaling \$39,832, one on research studies dealing with an enzymatic process to remove the viscera of the fish, and the other dealing with production processing procedures. Massachusetts Institute of Technology, a contract of \$23,830, to study flavor reversion factors in FPC. Battelle Memorial Institute, a contract of \$147,000, to set up a solvent extraction process. Artisan Industries, Inc., a contract of \$101,000 to set up a bio-digestion process for fish protein concentrate.



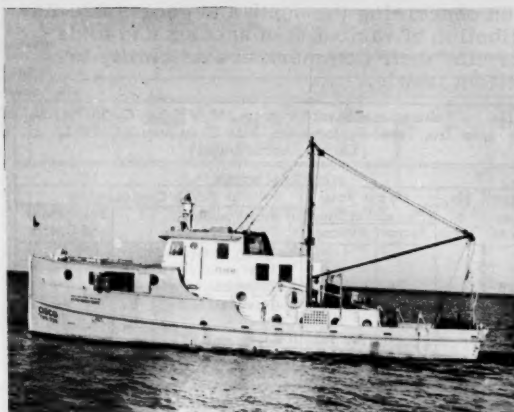
Great Lakes Fisheries

Exploration and Gear Research

TRAWLING INVESTIGATIONS IN NORTHERN LAKE MICHIGAN:

M/V "Cisco" Cruise 12 (July 2-16, 1963): To determine the availability of various species of fish to standard otter trawl fishing gear and define trawlable areas in Green Bay and other areas in northern Lake Michigan were to be primary objectives of this cruise by the U. S. Bureau of Commercial Fisheries research vessel Cisco. The lake-wide transect from Ludington, Mich., to Manitowoc, Wis., were to extend knowledge regarding the seasonal bathymetric distribution, relative abundance, and availability to trawls of various species.

High resolution echo-sounding equipment was to be used to survey bottom conditions and record both bottom and off-bottom fish



U. S. Bureau of Commercial Fisheries research vessel Cisco.

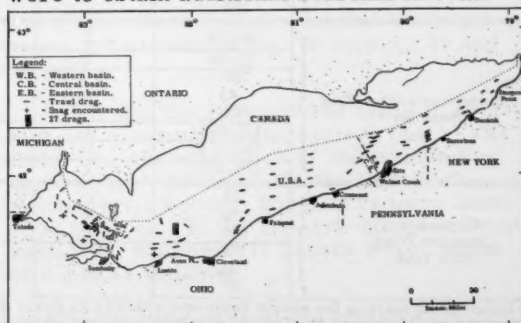
concentrations. Bathythermograph recordings and bottom samples were to be taken at each fishing station. A 52-foot (headrope) Gulf of Mexico-type otter trawl was to be used at standard stations to assess the commercial trawling potential.

It was decided to use the biological research vessel Cisco for these exploratory fishing operations and cooperative biological studies in the designated areas. The Bureau's exploratory fishing vessel Kaho (cruise 11-May 22-June 20) was used for environmental studies in Lake Erie.

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TRAWL FISHING INVESTIGATION OF LAKE ERIE CONTINUED:

M/V "Kaho" Cruise 11 (May 22-June 20, 1963): Primary objectives of this Lake Erie cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Kaho were to obtain additional seasonal informa-



M/V Kaho Cruise 11, May 22-June 20, 1963.

tion concerning the depth and geographic distribution of various fish species and to determine their commercial availability to bottom trawls.

Table 1 - Fishing Assessment Summary, M/V Kaho, Cruise No. 11, Lake Erie Trawl Explorations, May 22 to June 20, 1963. (Thirty-minute drags.)

WESTERN BASIN					
Depth Range (Feet)	No. of Drags	Catch Rate (Pounds Per Drag)		Catch Composition	
		Range	Average	Species	Percentage of Catch
18 to 24	1/7	96 to 805	260	Yellow perch (over 8")	12
				Yellow perch (4" to 8")	13
				Yellow perch (under 4")	4
				Sheepshead	44
				Carp	1
				Catfish	12
				Smelt	2
25 to 48	2/20	76 to 1629	340	Other species	12
				Yellow perch (over 8")	4
				Yellow perch (4" to 8")	28
				Yellow perch (under 4")	2
				Sheepshead	28
				Carp	17
				Catfish	6
				Smelt	2
				Other species	3/14

1/Includes one 10-minute drag that tore up while catching 224 pounds of fish.

2/Includes one 25-minute drag (hauled up to avoid bad bottom) and two 30-minute drags that tore up while catching 260, 200, and 226 pounds of fish, respectively.

3/Includes one catch containing 500 pounds of fresh-water clams.

A total of 87 routine assessment-type drags was made--27, 37, and 23 in the western, central, and eastern basins, respectively--with standard 52-foot (headrope) Gulf of Mexico-type semiballoon fish trawls. An additional series of 26 drags was made off Avon Point for studies on cod end mesh-size-selectivity for yellow perch and time-of-day effectiveness of otter-trawl fishing. All drags were for 30 minutes except for six which were lifted early due to unexpected appearances of bottom obstacles or gill nets, and when the net was obviously fouled. Four trawl nets were severely damaged and one net entirely lost during the explorations.

This cruise furnished additional evidence that otter trawls are capable of producing commercial quantities of species other than smelt in Lake Erie. Trawl catches of sheepshead, carp, channel catfish, and yellow perch were as good or better than any that have been made since trawling was introduced to Lake Erie.

Sheepshead were taken in quantity in the western basin along with carp, channel catfish, and yellow perch (table 1). Best catches

Table 2 - Fishing Assessment Summary, M/V Kaho, Cruise No. 11, Lake Erie Trawl Explorations, May 22 to June 20, 1963. (Thirty-minute drags.)

EASTERN BASIN						
Area	Depth Range (Feet)	No. of Drags	Catch Rate (Pounds Per Drag)		Catch Composition	
			Range	Average	Species	Percentage of Catch
Erie, Pennsylvania	54 to 74	3	1 to 83	28	Yellow perch	1/36
					Smelt	60
					Other species	4
	75 to 99	2/4	90 to 553	237	Yellow perch	9
					Smelt	91
					Other species	3/0
	100 to 124	1	50	50	Yellow perch	40
					Smelt	60
Pennsylvania-New York Boundary					Other species	0
	125 to 132	1	100	100	Yellow perch	50
					Smelt	50
					Other species	0
	57-74	1	90	90	Smelt	100
	75-99	1	150	150	Smelt	100
	100 to 124	2	180 to 250	215	Smelt	100
	125-149	1	25	25	Smelt	100
Dunkirk to Sturgeon Point, New York	150-174	0	-	-	-	-
	175-192	1	20	20	Smelt	100
	51 to 74	5	34 to 385	244	Yellow perch	2
					Smelt	97
					Other species	1
	75 to 99	3	35 to 92	69	Yellow perch	0
					Smelt	99
					Other species	1

1/Yellow perch taken in the eastern basin were virtually all in the under 4-inch size category.

2/Includes one 15-minute drag (hauled up to avoid set nets) which still caught 203 pounds of fish.

3/0 = less than 0.5 percent.

Table 3 - Fishing Assessment Summary, M/V Kaho, Cruise No. 11, Lake Erie Trawl Explorations, May 22 to June 20, 1963. (Thirty-minute drags.)

Area	Depth Range (Feet)	No. of Drags	CENTRAL BASIN Catch Rate (Pounds Per Hour)		Catch Composition	
			Range	Average	Species	Percentage of Catch
Sandusky to Cleveland, Ohio	18 to 24	1	72	72	Yellow perch (4" to 8") Smelt Sheepshead Other species	10 6 68 14
	25 to 49	1/7	52 to 600	290	Yellow perch (over 8") Yellow perch (4" to 8") Yellow perch (under 4") Smelt Other species	7 9 41 38 5
	50 to 69	8	88 to 552	189	Yellow perch (over 8") Yellow perch (4" to 8") Yellow perch (under 4") Smelt Other species	41 16 23 18 2
Cleveland to Fairport, Ohio	42 to 49	2/1	35	35	Yellow perch (over 8") Yellow perch (4" to 8") Yellow perch (under 4") Smelt Other species	3/ 0 0 71 29 0
	50 to 74	9	35 to 680	208	Yellow perch (over 8") Yellow perch (4" to 8") Yellow perch (under 4") Smelt Other species	25 4 29 42 0
	75	1	35	35	Yellow perch (over 8") Yellow perch (4" to 8") Yellow perch (under 4") Smelt Other species	14 0 0 86 0
Ashtabula, Ohio to Walnut Creek, Pennsylvania	36 to 49	1	242	242	Yellow perch (over 8") Yellow perch (4" to 8") Yellow perch (under 4") Smelt Other species	12 29 17 41 1
	50 to 74	6	21 to 580	264	Yellow perch (over 8") Yellow perch (4" to 8") Yellow perch (under 4") Smelt Other species	20 4 20 54 2
	75 to 78	1	180	180	Yellow perch (over 8") Yellow perch (4" to 8") Yellow perch (under 4") Smelt Other species	3 0 3 94 0

1/One other drag encountered snag; net was lost.

2/One other drag encountered snag; gear was severely damaged.

3/0 = less than 0.5 percent.

of those species were: sheepshead--200, 550, and 950 pounds; carp--440 and 510 pounds; channel catfish--100 and 200 pounds; and yellow perch--180, 190, 190, 315, and 500 pounds.

Several good catches of yellow perch were taken in the central basin (up to 540 pounds per drag). Two drags off Avon Point and one off Fairport, Ohio, at 9 and 11 fathoms, yielded 430, 280, and 160 pounds of yellow perch measuring over 8 inches long. Thirteen drags in the central basin yielded from 100 to 470 pounds of smelt and averaged 198 pounds per drag. Several good smelt catches

were taken in each of the central basin sub-areas and at various depths between 36 and 78 feet.

Smelt was the only species taken in commercial quantities in the eastern basin. Off Erie, Pa., the best catch of 550 pounds was taken at 15.5 fathoms. On the New York-Pennsylvania border, 250 pounds were taken at 18 fathoms. In the Dunkirk-Sturgeon Point area, 250, 350, and 375 pounds were caught at 8.5 to 11 fathoms.

The final few days of the cruise were devoted to yellow perch cod end mesh-size-

selectivity tests and time-of-day otter trawl effectiveness experiments off Avon Point, Ohio. Mesh-size-selectivity tests were conducted with a "trouser leg" cod end--a means of fishing two cod ends of different mesh size simultaneously on one net. The mesh-size-selectivity information is being tabulated, analyzed, and incorporated with data from similar work carried out in 1962 and will be available for distribution at a later date.

The time-of-day otter trawling effectiveness for yellow perch was not significantly different between daytime and nighttime drags. However, smelt catches varied from virtually none during hours of darkness to good catches in the daytime.

Surface temperatures ranged from 52° to 69° F. and thermal stratification occurred from the deeper waters of the eastern basin as far west as Avon Point in the central basin.

Note: See Commercial Fisheries Review, July 1963 p. 37.



Great Lakes Fishery Investigations

LIMNOLOGICAL STUDIES EXPANDED:

The Ann Arbor Biological Laboratory of the U. S. Bureau of Commercial Fisheries has been conducting fishery and limnological studies of the Great Lakes since 1927. Limnological investigations were expanded somewhat in 1951 from the extremely limited operations of earlier years, and a separate limnological unit was established in 1957. Recent work has included: general surveys, long-term studies, and unit studies.

Until recently, the large size of the Great Lakes and a lack of suitable vessels and equipment handicapped the exploration of many aspects of their limnology. Various ideas and equipment have been borrowed from marine scientists. Bathythermographs, reversing thermometers, Nansen bottles, Clarke-Bumpus plankton samplers, sonic fathometers, and coring devices are now as commonplace on Great Lakes research vessels as on oceanographic vessels. The methods used by oceanographers are not entirely applicable, however, and must be modified for conditions peculiar to large lakes. The Lakes thus offer a meeting ground between limnology and oceanography.

Following is a summary of the Great Lakes limnological studies conducted in 1962 by the Bureau:

The sampling efficiencies of the Petersen, orange-peel, and the Smith-McIntyre dredges in relation to water depth and bottom type were compared.

A study initiated in 1961 to determine the changes in the species composition, distribution, and abundance of benthic organisms in western Lake Erie was brought near completion. The last survey of this nature was made in 1930. Formerly abundant and widely distributed mayfly nymphs are now found in only very small numbers, while populations of tubificid worms and midge larvae have increased in all areas.

A total of 500 drift bottles was released in Lake Superior in midsummer as part of a study of the relation between movements of marked hatchery-reared lake trout and the counterclockwise littoral currents along the south shore. About 50 percent of the bottles were recovered by December.

During the past 6 years, very low dissolved oxygen concentrations have been observed in the hypolimnetic waters of Lake Erie, over an area of about 3,000 square miles. Laboratory and field measurements were made of the oxygen demand of the sediments and the water, and of the organic content of the sediments. The sediments have a high immediate oxygen demand which is probably chemical and a continued gradual uptake of oxygen which is probably biological. Sediments with the highest oxygen demand had the greatest organic content. The oxygen demand of the hypolimnetic water alone was not great enough to account for the low dissolved oxygen concentrations observed.

Study of the micro-organic constituents of the Great Lakes waters has been directed toward improving sampling procedures and methods for identifying the organic compounds. In the interim, activated charcoal filters are being used to adsorb and concentrate the organic materials in water. In addition, filter units were operated at a Lake Huron field station and aboard the Bureau's research vessel Cisco, in Lake Michigan.

Note: See Commercial Fisheries Review, December 1962 p. 36, August 1962 p. 21, and June 1962 p. 17.

* * * * *

DISTRIBUTION AND ABUNDANCE OF SMALL LAKE TROUT IN LAKE SUPERIOR SURVEYED:

M/V "Siscowet" Cruise 1 (May 17-29, 1963): The distribution and abundance of juvenile lake trout were studied in the Apostle Islands region of Lake Superior during this cruise by the U. S. Bureau of Commercial Fisheries research vessel Siscowet. Semiballoon trawls and experimental gill nets (2 nets of each of 6 mesh sizes, from 2 to 3½ inches) were fished at depths of 18-29 fathoms.



Research vessel Siscowet of the U. S. Bureau of Commercial Fisheries.

Catches from trawls included 222 lake trout (4.6 to 21.7 inches long) of which 219 (98.6 percent) were hatchery-reared. Lake trout taken were from 11 plants made in the Apostle Islands region; fish from the 1962 spring plant were most common. All of the juvenile lake trout were returned to the water alive after removal of the anal fin. Other species were relatively scarce in the catches, although small numbers of smelt, chubs, and yearling coregonines were taken in most of the tows.

Experimental gill nets yielded 82 lake trout ranging from 8.3 to 21.9 inches long. Seventy (85.4 percent) were fin-clipped; 10 plants were represented in the catches. Lake trout from the 1960 Bayfield spring plant were most common. Other fish taken in the gill nets included burbot, lake herring, and chubs.

Small lake trout were most abundant at 20-25 fathoms where the water temperature was about 39° F. Surface water temperatures ranged from 37.6° F. east of Madeline Island to 48.2° F. in Punky Bay.

Note: See Commercial Fisheries Review, January 1963 p. 31, December 1962 p. 37. * * * * *

LAKE MICHIGAN FISH POPULATION SURVEY CONTINUED:

M/V "Cisco" Cruise 4 (June 11-25, 1963): The depth distribution of fish fry, especially coregonids (whitefishes), and of larger chubs and associated fish species was studied; special emphasis was placed on that area of the bottom where a rapid change in temperature occurs with a change in depth. These were the primary objectives of this cruise by the U. S. Bureau of Commercial Fisheries research vessel Cisco. Operations were conducted in southeastern Lake Michigan, mostly in the Saugatuck-Holland area, but with some trawling near Grand Haven.

Fry were sampled over bottoms of 3 to 60 fathoms with half-meter and meter plankton nets of No. 656 Nitex (0.0258-inch mesh). Chub fry were caught in the 30- to 60-fathom depth range (mostly at 35 to 50 fathoms). They were distributed vertically from near-surface to near-bottom, but were considerably more common in the deeper levels. Many more were caught than on cruise 2 by the same vessel, but the mesh of the net used during the earlier sampling period (No. 1179 Nitex, 0.0464-inch mesh) apparently was too large to take chub fry effectively. Identical tows with meter nets of 656 and 1179 Nitex during this cruise indicated that probably at least 80 percent of the chub fry were lost by the larger-mesh net.

The only fry caught besides coregonids were deepwater sculpins and yellow perch. The sculpins were scarce, and found only over a 50-fathom bottom. The perch fry were numerous on June 14 just north of the Saugatuck breakwater in shallow water (3-7 fathoms) from surface to bottom, but were scarce 3 miles north of that area at the same depths. Those near the breakwater had disappeared by the following day, and none were caught elsewhere.

Ten-minute tows with a ¾-size North Atlantic semiballoon trawl (½-inch-mesh cod end) were made off Saugatuck at 3, 5, 7, 10, 12, 15, and 17 fathoms (1 to 3 tows) and at 5-fathom intervals from 20 to 50 fathoms (single tows), and off Grand Haven at 5, 7, 10, 12, and 15 fathoms (single tows). Although thermal stratification had begun (surface water temperatures mostly 50°-57° F.), no sharp thermocline had developed, and there was no bottom area where the temperature changed rapidly. Consequently, depth distribution of the various fish species (which was similar off Grand Haven and Saugatuck) was

not as sharply defined as it probably will be later this year. Alewives were abundant at 3-7 fathoms, common at 10-12 fathoms, and somewhat scarce at 15 fathoms and deeper. Yellow perch were commonest at 3-10 fathoms but were in fair numbers at 12 fathoms. They were scarce in deeper water, although at least one was caught at all depths out to 35 fathoms. Chubs (bloaters) were common from 10-50 fathoms with no notable areas of concentration but were scarce at 5 to 7 fathoms, and absent at 3 fathoms. Other species which were caught commonly included slimy sculpins (common at 15-40 fathoms), deep-water sculpins (40-50 fathoms), smelt (5-20 fathoms, commonest at 12-15), spottail shiners (3-7 fathoms), and trout-perch (5-12 fathoms, commonest at 7). Species caught in very small numbers included emerald shiners, carp, log perch, lake herring, and whitefish (5 of which were 9 to 10 inches long).

Blood, eye lenses, and muscle tissue were collected for serological and electrophoretic studies of chubs, designed to aid in the separation of the various species.

Attempts to catch small chubs in a 5-foot-square net towed in midwater failed. The net was towed obliquely from surface to bottom at 30, 35, and 40 fathoms.

The Cisco was under contract to the U. S. Public Health Service during cruise 3 (May 21-June 4) when limnological and bacteriological samples were collected in northern Lake Michigan.

Note: See Commercial Fisheries Review, July 1963 p. 37.

WESTERN LAKE SUPERIOR FISHERY SURVEY:

M/V "Siscowet" Cruise 2 (June 3-20, 1963): Spring environmental conditions were studied at three limnological stations in the Apostle Islands region of Lake Superior during this cruise by the U. S. Bureau of Commercial Fisheries research vessel Siscowet. Routine limnological collections included records of water temperature, Secchi-disc readings, water samples for chemical analyses, and bottom and plankton samples. Surface water temperature ranged from 40.6° F. to 54.7° F. in the immediate vicinity of the Apostle Islands but only 37.0° F. in the open lake.

Studies were continued on the abundance and distribution of juvenile lake trout in western Lake Superior. Three index stations were established where the abundance of small lake trout was measured by systematic fishing with bottom trawls, with 10 to 15 tows made at each station. The average number of young lake trout caught per 15-minute tow was 3.5 east of Madeline Island, 5.7 southeast of Bear Island, and 24.8 east of Basswood Island. The total catch was 607 (average length, 8.0 inches), of which 600 (98.8 percent) were fin-clipped. Other species in the catches included smelt, chubs, and sculpins.

Experimental gill nets (2 nets each of 6 mesh sizes, from 2 to 3½ inches) yielded 186 lake trout (average length, 13.3 inches), of which 175 (84.1 percent) were hatchery-reared.



Gulf Exploratory Fishery Program

GEAR RESEARCH IN GULF OF MEXICO COORDINATED WITH SHRIMP MARKING STUDIES:

M/V "Silver Bay" Cruise 49 (June 17-28, 1963): This cruise was divided into three phases: (1) shrimp sampling with 40-foot trawls along the Mississippi and Alabama coasts in depths of 4 to 60 fathoms; (2) mesh-selectivity studies, with trawls and cod ends of varying mesh sizes and fitted with cod-end covers; and (3) mortality and migration studies on brown shrimp (*Penaeus aztecus*). As a part of the phase 3 studies, 4,801 shrimp were captured, stained, and released, and 1,208 were tagged.

The U. S. Bureau of Commercial Fisheries exploratory fishing vessel Silver Bay operated in the northern Gulf of Mexico during this 12-day cruise under a charter agreement with the Bureau's Biological Laboratory at Galveston, Tex.

The vessel returned to her base at Pascagoula, Miss., on June 28, after which she was placed in a local shipyard for annual hauling and maintenance.

MOTION PICTURES USED TO STUDY DEEP-WATER SHRIMP BEHAVIOR:

M/V "Oregon" Cruise 85 (May 15-June 19, 1963): Successful deep-water motion picture

photography of shrimp trawl operation and the reaction behavior of shrimp to trawls was achieved during this cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon. The objective of the cruise, which was conducted in 5 phases, was to calibrate and field test a self-contained deep-water motion picture camera designed by the Bureau's staff. The work was carried out in the north central Gulf of Mexico, and motion picture camera operations were conducted at depths of 200 and 210 fathoms. This equipment was developed to obtain direct photographic records to be used in determining the efficiency of trawling gear on royal-red shrimp (Hymenopenaeus robustus) stocks.

Two cameras were used during the trials--the experimental 16 millimeter motion picture camera (400' film capacity) and lighting system, and an Edgerton CA-8 still camera. The motion picture camera was mounted on the headrope of a 40-foot shrimp trawl while in operation. The still camera was placed on the sea floor for detailed study of bottom conditions.

The first three cruise phases were devoted exclusively to housing and equipment testing and the development of handling procedures. Experimental application of the equipment during phases 4 and 5 produced some 1,400 feet of motion picture film and 2,000 still negatives.

Individual trawl drags were limited to 30 minutes each so as to minimize chances of equipment loss by bottom fouling. The motion picture camera was positioned to shoot parallel to the trawl mouth immediately in front of the footrope. A preliminary review of the footage obtained showed numerous fish and shrimp to be present, but detailed study and additional footage will be required to reach conclusive opinions on behavior. In general, shrimp reactions ranged from passive inactivity to violent flipping and swimming. The smaller deep-water shrimp (Peneaeopsis megalops) were identified in the films and royal-red shrimp were tentatively identified. Both species were present in catches made during successful film runs. Most of the fish photographed appear to belong to the grenadier family Macrouridae, although many other as yet unidentified species were photographed. Most of the fish appeared capable of vigorous swimming and displayed deliberate escapement reactions, including diving into the mud bottom.

Still photographs of the bottom showed many areas "carpeted" with a thin layer of unidentifiable material, sufficiently fragile to indicate that there has been no previous discernable evidence from trawling activity. Dense patches of mud-dwelling white anemones were photographed. A single identifiable shrimp (P. megalops) was photographed hovering or swimming a few inches over the bottom.

A short cruise to continue equipment testing was scheduled for mid-July, pending receipt of special lighting equipment. Photographic evaluation with this equipment is to be conducted later in conjunction with exploratory fishing cruises by the Bureau's vessels Oregon and Silver Bay.

In addition to the operations conducted on this cruise, a series of bottom color photographs was taken in cooperation with the National Geographic Society, using the CA-8 camera furnished by them.

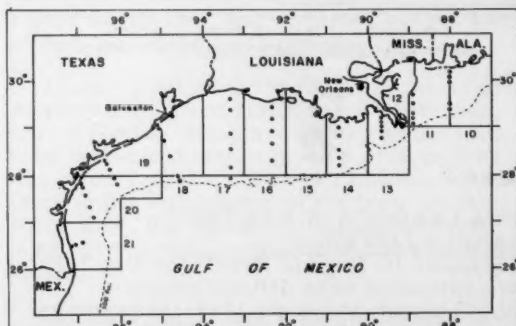
Note: See Commercial Fisheries Review, July 1963 p. 38.



Gulf Fishery Investigations

SHRIMP DISTRIBUTION STUDIES:

M/V "Gus III" Cruise GUS-6 (June 6-July 1, 1963): Excellent catches of brown shrimp were made off the coast of Louisiana and Galveston, Tex., during this cruise by Gus III. The chartered vessel (operated by the Galveston Biological Laboratory of the U. S. Bureau of Commercial Fisheries) is engaged in a continuing study of shrimp in the Gulf of Mexico.



Shows the station pattern for the shrimp distribution studies in the Gulf of Mexico during Cruise 6 of Gus III and Cruise SB-49 of the Silver Bay.

Eight statistical areas (13, 14, 16, 17, 18, 19, 20, and 21) were covered. One 3-hour tow with a 45-foot shrimp trawl was made in each of 3 depth ranges (0-10, 10-20, and over 20 fathoms) in all areas.

The best catches of brown shrimp were made in 10-20 fathoms. Individual tows in that depth took 219 pounds of 31-40 count brown shrimp from area 14, and 120 pounds of 31-40 count brown shrimp from area 13. The same depth range produced a catch of 146 pounds of 51-67 count brown shrimp in area 18.

Area 20 yielded a catch of 50 pounds of 15-20 count brown shrimp from the over 20-fathom depth, and 23 pounds of over 68 count brown shrimp from the 10-20 fathom range. The brown shrimp catch in the other areas was light.

White shrimp were only found in the under 10-fathom depth. Moderate catches of 15-20 count white shrimp were taken in area 16 (45 pounds), area 19 (26 pounds), and area 18 (11 pounds). The white shrimp catch in other areas was light.

The pink shrimp catch was light at all stations sampled.

M/V "Silver Bay" Cruise SB-49 (June 17-19, 1963): Catches of brown and white shrimp were light during this shrimp distribution study off the coast of Alabama and Mississippi by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Silver Bay. The cruise, which covered statistical areas 10 and 11, resulted in modest catches of pink shrimp from the less than 10-fathom depth.

Notes: (1) Shrimp catches are heads-on weight; shrimp sizes are the number of heads-off shrimp per pound.

(2) See Commercial Fisheries Review, July 1963 p. 40.



Hawaii

TUNA LANDINGS IN MAY 1963 SHARPLY LOWER:

Skipjack landings in Hawaii for May 1963, were estimated to be 660,000 pounds--400,000 pounds below the 1948-1962 average. During the first five months of 1963, landings were estimated at about 1,750,000 pounds. This estimate is 640,000 pounds below the 1948-1962 average for the same period.

In May this year, there were 115 productive trips, giving an average of 3,648 pounds per productive trip. Individual vessel landings ranged from 132 to 11,792 pounds.

Cannery records for May 1963 indicate that 40.7 percent of the fish by weight were small (4-8 lbs.); 6.5 percent were small-medium (4-15 lbs.); 21.8 percent were medium (8-15 lbs.); and 31.0 percent were large (15 lbs. and up). Landings of small fish were heaviest the first part of the month. The medium and large fish first entered the fishery about May 15.



Industrial Fishery Products

COST FACTOR IMPORTANT IN USE OF FISH MEAL IN POULTRY FEED:

In mid-May 1963, a U.S. Bureau of Commercial Fisheries animal nutritionist visited scientists at several universities to discuss uses of fish meal in animal and poultry feeding.

According to one of the speakers at the American Feed Manufacturers Association Convention and National Feed Show at Chicago, Ill., May 12-15, the feed production industry is already the largest in the United States devoted exclusively to supplying goods and services to agriculture and is the 13th largest manufacturing industry in the country. Some idea of the speed with which the feed industry has grown may be gained from the fact that commercial feed tonnage increased by 200 percent from 1939 to 1958.

The animal nutritionist stopped first at the University of Michigan. At that institution, it was pointed out that percentage utilization of fish meal in commercial mixed poultry rations is lower than it was a few years ago. In compliance with general practice, the recommended Michigan rations for growing chickens contain relatively low levels of fish meal; broiler-starter and finisher rations contain 1.5 and 1 percent fish meal, respectively, and allowances for young chickens of the layer type are similar to those for broilers. On the other hand, the Michigan recommendation for laying hens is 1 percent (doubtless considerably in excess of the amount ordinarily present in commercial laying rations), and for turkey starters and growers, allowances are 5 and 2.5 percent fish meal in the rations.

At Rutgers University, New Brunswick, N.J., a professor stated that fish meal is used at the 3-percent level in the chick starter rations recommended by the New Jersey Experiment Station. Such rations, containing 22 percent protein, are extremely efficient, according to the professor.

One locality in which relatively liberal amounts of fish meal are still fed is the Delaware, Maryland, Virginia (Delmarva) area. Percentage utilization of fish meal in broiler feeds is greater in that area than anywhere else, according to a professor of the University of Delaware, meal allowances being from 5 to 7 percent of the ration. Practically all of the fish meal produced in the large plants in the Delmarva area plus a great deal brought in from the outside is utilized in poultry feeds in the area.

Although the percentage of fish meal now incorporated in commercial poultry rations is relatively low, this situation could change radically with a shift in prices of fish meal and other feed ingredients. This point is borne out by experience with rations formulated by computers to yield maximum profits. Recently, the University of Delaware professor

formulated a broiler ration in this way, allowing the computer to select from a number of possible ingredients the amounts of each that would satisfy nutritional requirements at least cost. Fish meal in the Delmarva area, selling at \$118 a ton when the ration was formulated, was entered at that price and limited to 6 percent of the ration or less. The computer, "programmed" to formulate a ration to given specifications at least cost, incorporated the full 6 percent of fish meal, or the maximum amount it was permitted to include, in the ration. Fish meal prices are, of course, lower in the Delmarva area, due to the proximity of most points in that region to large fish meal plants, than they are in areas farther from a source of supply. If, in the formulation, prices of feedstuffs at a point relatively distant from a source of supply were used and if the computer were permitted to incorporate as much as 6 percent fish meal, the full allowance might or might not be utilized depending upon relative prices of the various feedstuffs.

The University of Delaware's experience with its formulation suggests that a slight price shift could result in a great increase in demand for fish meal throughout the country.

GROWTH FACTOR IN FISH MEAL AND SOLUBLES STILL UNIDENTIFIED:

It has long been known that fish solubles and fish meal contain a factor that stimulates the growth of chicks, but the identity of this factor has never been determined. Now, some recently published results of a painstaking investigation by a group of well-known scientists confirm both the elusive nature of this unidentified growth factor (UGF) and the factor's growth-stimulating property. Chicks receiving a semipurified ration containing 4 percent menhaden fish solubles for 4 weeks gained 16 percent more weight than was gained by chicks on the same ration without solubles; this is an average of the results of 26 trials, carried on over a period of 3 years. In only one trial did the chicks that received solubles fail to outgain those on the basic ration.

The research, undertaken at the University of Wisconsin and reported in the May 1963 issue of the *Journal of Nutrition*, has demonstrated that the unidentified growth factor (UGF) is entirely organic in nature; some earlier workers reported that the factor is partly made up of an inorganic fraction. Because the recent work resulted in but little purification of the active factor, little was contributed toward the identification of the chemical nature of the factor; in other words, UGF appears to be still eluding identification as it always has in the past. In order to analyze and identify the factor chemically, scientists will have to concentrate and purify it so that it is uncontaminated by foreign substances.

Poultry nutritionists should keep in mind the fact that the most dependable known sources of the chick growth factor of fish are fish solubles and fish meal.

NET PROTEIN VALUES OF FISH MEAL DETERMINED WITHOUT CHEMICAL ANALYSIS:

Because the ratio of water to nitrogen in birds and mammals is quite constant, the net protein values of fish meal and other feedstuffs can be determined merely by weighing the carcasses of chicks, fed a test diet for 2 weeks or somewhat less, before and after drying. The method, adapted from earlier work published abroad and developed at Rutgers (New Jersey) University yields important information with a minimum of laboratory work. Prior to using the method as a practical assay procedure, the ratio between the water and nitrogen of the chick body is determined after a ration of the type to be assayed has been consumed for 2 weeks. Once this ratio is known, it is necessary only to make body moisture determinations and use them in estimating body nitrogen. Thus, the analytical procedure ordinarily required to determine net protein values is eliminated except for the weighing of carcasses, before and after drying, to determine body moisture.

Far from being just a rough approximation, the test is actually quite sensitive. For example, when fish meal replaced 4 percent of the soybean protein of a corn-soy test ration, net protein value of the ration increased by 15 percent (from 56.1 ± 0.2 to 64.7 ± 0.2). The test ration contained a small amount of alfalfa meal and was similar to a conventional commercial chick starter ration except for the fact that the protein level was held at 13 instead of 21 percent.

To carry out an assay, day-old chicks are supplied a standard ration for 1 week, then, after weighing, some are placed on the feed to be tested and others given a protein-free ration for 2 weeks. Feed is removed 12 hours prior to the termination of the test. At the latter time, the chicks are killed and dried in an oven at 85°C ., or 185°F ., to constant weight.

Moisture values are the difference between final weight prior to drying and the dried weight. The weight of body water or moisture divided by a factor representing the ratio of

body water to nitrogen represents the nitrogen of the body. The factor must be predetermined in tests in which both body-nitrogen and -water are measured. But once this ratio is known for a given type of ration, routine assays can be carried out indefinitely without the necessity for the determination of body nitrogen.

The reason why some chicks are given a protein-free ration is that otherwise it would be necessary to assume that protein incorporated in the body is proportional to gain in body weight. By feeding a protein-free ration to some chicks, the difference between weight gains of the two different groups, instead of total weight gained by the animals on the test ration, can be used as the criterion of the protein gained.

The University's procedure not only shows how much protein is used for maintenance, but also makes possible the evaluation of proteins of such poor quality as to fail to promote growth. (Technical Advisory Unit, U. S. Bureau of Commercial Fisheries, Boston, Mass.)

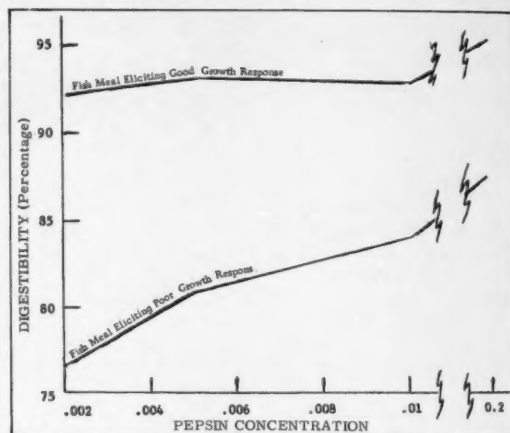
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TESTS FOR DIGESTIBILITY OF FISH MEAL PROTEINS IMPROVED BY LOWERING CONCENTRATION OF PEP SIN:

The pepsin digestibility tests presently in use are not sufficiently sensitive to permit differentiation between fish meals having proteins that are highly digestible and those with proteins having lower coefficients of digestibility, according to some users. Endeavoring to increase the sensitivity of the tests, workers at various laboratories are carrying out experiments in which the test procedure is modified in various ways. Some experiments have involved changes in concentration of the enzyme (pepsin) employed whereas others have involved changes in concentration of the acid used with the enzyme. Still other experiments have dealt with the effects of various temperatures on pepsin digestion. In addition, studies have been made of the effects of shortening the time allotted to the digestive process. Some variations in enzyme concentration used during the investigations have increased the sensitivity of the test, but most of the other experimental modifications of the test have been unproductive.

The present standard pepsin digestibility method consists of the digestion of one gram

of a defatted sample ground to pass a 2-milimeter screen, with 0.2-percent pepsin (1:10,000) in 0.075 normal hydrochloric acid for 16 hours at 45° C., with continuous end-over-end agitation. This technique has been recommended by the Association of Official Agricultural Chemists since 1960. By using an enzyme solution with a concentration equal to only one-hundredth of that employed by the standard test in determining digestibilities of fish meals, scientists of the U. S. Bureau of Commercial Fisheries have increased the sensitivity of the tests appreciably, as the following figure shows.



Influence of enzyme concentration on sensitivity of pepsin digestion tests. ^{1/}

Two British scientists have carried the dilution studies a step further by using a dilution one thousand times greater than that of the standard test. This has resulted in still greater sensitivity in determining the digestibility of fish meals.

As the work on the improvement of the tests progresses, doubtless the pepsin digestibility test will become still more sensitive and therefore may be a more reliable criterion of the digestibility of proteins.

^{1/}From Ambrose, Mary E., 1962. "The Pepsin Digestibility of Fish Meal." Mimeo. report, U. S. Bureau of Commercial Fisheries Technological Laboratory, College Park, Md.

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U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January-May 1963: Based on domestic production and imports, the United States available supply of fish meal for January-May 1963 amounted to 219,138 short tons--44,040 tons (or 25.2 percent) more than during the same period in 1962. Domestic production was 5,009 tons (or 8.3 percent) less, but imports were 49,049

tons (or 42.9 percent) higher than in the same period in 1962. Peru continued to lead other countries with shipments of 125,998 tons.

The United States supply of fish solubles (including homogenized fish) during January-May 1963 amounted to 27,672 tons--a decrease of 2,508 tons as compared with the same period in 1962. Domestic production and imports dropped 4.5 percent and 38.1 percent, respectively.

U. S. Supply of Fish Meal and Solubles, January-May 1963 with Comparisons			
Item	Jan. - May		Total 1962
	1/1963	1962	
	..... (Short Tons)		
Fish Meal and Scrap:			
Domestic production:			
Menhaden	39,381	36,204	238,680
Tuna and mackerel	9,430	12,131	26,559
Herring	-	346	5,095
Other	6,845	11,984	40,898
Total production	55,656	60,665	311,232
Imports:			
Canada	17,576	19,875	42,806
Peru	125,998	85,414	186,249
Chile	14,751	2,259	9,247
So. Africa Republic	3,950	6,484	10,084
Other countries	1,207	401	3,921
Total imports	163,482	114,433	252,307
Available fish meal supply	219,138	175,098	563,539
Fish Solubles:			
Domestic production 2/.	25,556	26,762	124,334
Imports:			
Canada	1,028	795	1,335
Iceland	-	2,205	2,332
Other countries	1,088	418	2,641
Total imports	2,116	3,418	6,308
Available fish solubles supply ..	27,672	30,180	130,642

1/ Preliminary.

2/ 50-percent solids. Includes production of homogenized condensed fish.

Note: Differences in totals between the various tables showing data on industrial fishery products are due to partial preliminary estimates and later revisions.



Brailing menhaden from the pocket or bunt of a purse seine. Fish meal, oil, and solubles are produced from menhaden. More modern purse seiners are now equipped with large suction hoses to transfer the fish from the net to the vessel.

Production and Imports, January-April 1963: Based on domestic production and imports, the United States available supply of fish meal for January-April 1963 amounted to 148,985 short tons--39,660 tons (or 36.3 percent) more than during the same period in 1962. Domestic production was 4,259 tons (or 21.1 percent) less, but imports were 43,919 tons (or 49.3 percent) higher than in the same period in 1962. Peru continued to lead other countries with shipments of 104,219 tons.

The United States supply of fish solubles (including homogenized fish) during January-April 1963 amounted to 9,946 tons--a decrease of 3,183 tons as compared with the same period in 1962. Domestic production and imports dropped 17.1 percent and 46.8 percent, respectively.

U. S. Supply of Fish Meal and Solubles, January-April 1963 with Comparisons			
Item	Jan.-Apr.		Total 1962
	1/1963	1962	
..... (Short Tons)			
Fish Meal and Scrap:			
Domestic production:			
Menhaden	4,991	4,265	238,680
Tuna and mackerel	7,167	9,295	26,559
Herring	1/	295	5,095
Other	3,744	6,306	40,898
Total production	15,902	20,161	311,232
Imports:			
Canada	13,603	14,748	42,806
Peru	104,219	67,725	186,249
Chile	12,220	2,039	9,247
So. Africa Republic	1,950	4,501	10,084
Other countries	1,091	151	3,921
Total imports	133,083	89,164	252,307
Available fish meal supply	148,985	109,325	563,539
Fish Solubles:			
Domestic production 3/	8,268	9,976	124,334
Imports:			
Canada	781	600	1,335
Iceland	-	2,205	2,332
Other countries	897	348	2,641
Total imports	1,678	3,153	6,308
Available fish solubles supply ..	9,946	13,129	130,642

1/ Preliminary.

2/ Included with "other."

3/ 50-percent solid. Includes production of homogenized condensed fish.

1/ Preliminary.

2/ Included with "other."

3/ 50-percent solids. Includes production of homogenized condensed fish.

U. S. FISH MEAL, OIL, AND SOLUBLES:

Major Indicators for U. S. Supply, May 1963: United States production of fish meal in May 1963 was lower by 6.2 percent, as compared with May 1962. Fish oil and fish solubles production increased by 1.5 percent and 6.0 percent, respectively.

Major Indicators for U.S. Supply of Fish Meal, Solubles, and Oil, May 1963					
Item and Period	1963	1962	1961	1960	1959
..... (Short Tons)					
Fish Meal:					
Production 1/:					
July	-	52,574	62,586	55,696	52,132
June	-	58,397	53,162	44,293	52,006
May	39,754	42,374	32,922	17,194	25,312
January-April ..	15,994	13,604	13,724	12,387	14,155

(Table continued on next page)

Item and Period	1963	1962	1961	1960	1959
..... (Short Tons)					
Jan.-Dec. prelim. totals 2/	-	288,336	289,039	257,969	275,396
Jan.-Dec. final tot.	-	311,232	311,265	290,137	306,551
Imports:					
July	-	25,857	18,710	13,131	4,303
June	-	26,453	19,317	11,178	10,386
May	-	25,269	24,753	9,496	16,329
January-April	133,083	89,164	63,393	45,701	78,256
January-December	-	252,307	217,845	131,561	133,955
Fish Solubles:					
Production 3/:					
July	-	22,165	21,870	20,208	33,133
June	-	24,350	17,821	19,549	29,594
May	16,979	16,014	12,667	7,191	20,626
January-April	9,394	8,872	7,465	12,551	13,095
Jan.-Dec. prelim. total	-	120,063	109,018	106,361	176,913
Jan.-Dec. totals	-	124,334	112,241	98,829	165,359
Imports:					
July	-	306	708	96	4,938
June	-	872	207	149	954
May	-	265	283	58	4,874
January-April	1,878	3,153	729	2,310	3,997
Jan.-Dec. totals	-	6,308	6,739	3,174	26,630
..... (1,000 Pounds) 5/					
Fish Oils:					
Production:					
July	-	46,608	58,533	41,362	32,108
June	-	53,565	48,794	36,207	37,401
May	33,310	32,616	33,844	13,705	20,180
January-April	7,856	6,483	4,660	3,189	4,496
Jan.-Dec. prelim. totals 4/	-	257,131	259,400	206,848	189,240
Jan.-Dec. final tot.	-	255,808	266,670	215,861	193,324
Exports:					
July	-	128	4,421	40,603	28,276
June	-	4,822	21,036	14,360	11,358
May	-	6,481	3,192	2,427	10,910
January-April	75,401	51,593	43,900	34,764	27,089
Jan.-Dec. totals	-	123,050	122,486	143,659	144,481

1/Does not include crab meat, shrimp, and misc. meals.

2/Preliminary data computed from monthly data. Fish meal production reported currently comprised 90 percent for 1959, 89 percent for 1960, 93 percent for 1961 and 1962.

3/Includes homogenized fish.

4/Preliminary data computed from monthly data. Represents over 95 percent of the total production.

5/Beginning with March 1963, fish oil is shown in pounds instead of gallons. Conversion factor, 7.75 pounds equal 1 gallon.

Note: Data for 1963 are preliminary.

Production by Areas, May 1963: Preliminary data on U. S. production of fish meal,

U. S. Production ^{1/} of Fish Meal, Oil, and Solubles May 1963 (Preliminary) with Comparisons				
Area	Meal	Oil	Solubles	Homog- enized ^{3/}
	Short Tons	1,000 Pounds	Short Tons	Short Tons
May 1963:				
East & Gulf Coasts	37,400	33,024	14,402	-
West Coast ^{2/}	2,354	286	1,327	1,250
Total	39,754	33,310	15,729	1,250
Jan.-May 1963:				
Total	55,656	41,166	23,180	2,500
Jan.-May 1962:				
Total	55,978	38,680	21,232	3,695

1/Does not include crab meal, shrimp meal, and liver oils.

2/Includes Hawaii, American Samoa, and Puerto Rico.

3/Includes condensed fish.

Note: Beginning with March 1963 fish oil is shown in pounds instead of gallons. Conversion factor, 7.75 pounds equal 1 gallon.

oil, and solubles by areas for May 1963 as collected by the U. S. Bureau of Commercial Fisheries and submitted to the International Association of Fish Meal Manufacturers are shown in the table.

Production, May 1963: During May 1963, a total of 34.4 million pounds of marine animal oils and 39,754 tons of fish meal and scrap was produced in the United States. Compared with May 1962, this was an increase of 973,000 pounds or 2.9 percent in oil, and a decrease of 750 tons or 1.9 percent in meal and scrap production.

Menhaden oil, amounting to 32.3 million pounds, accounted for 94 percent of the May 1963 oil production. Compared with May 1962, this was an increase of 937,000 pounds or 3 percent. Menhaden meal, amounting to 34,390 tons, accounted for 86.5 percent of the May meal production—an increase of 2,451 tons, compared with the same month last year.

A total of 16,022 tons of fish solubles was produced in May 1963—an increase of 1,651 tons or 11.5 percent as compared with May 1962. The production of homogenized condensed fish amounted to 1,250 tons—a decrease of 1,165 tons as compared with May 1962.

Table 1 - U. S. Production of Fish Meal, Oil, and Solubles,
May 1963 1/with Comparisons

Table 1 - U. S. Production of Fish Meal, Oil, and Solubles, May 1963 1/with Comparisons					
Product	May		Jan.-May		Total
	1/1963	1962	1/1963	1962	
..... (Short Tons)					
Fish Meal and Scrap:					
Herring	-	51	2/	346	5,095
Menhaden 3/	34,390	31,939	39,381	36,204	238,680
Sardine, Pacific	-	-	9	648	702
Tuna and mackerel	2,263	2,836	8,430	12,131	26,358
Unclassified	3,101	5,678	6,836	11,336	27,297
Total	39,754	40,504	55,656	60,665	298,333
Shellfish, marine animal meal and scrap					
Menhaden	4/	4/	4/	4/	12,899
Grand total meal and scrap	4/	4/	4/	4/	311,232
Fish solubles:					
Menhaden	14,719	10,521	16,555	11,541	84,885
Other	1,303	3,850	6,301	11,571	28,353
Total	16,022	14,371	23,056	23,112	113,238
Homogenized condensed fish					
	1,250	2,415	2,500	3,650	11,096
..... (1,000 Pounds)					
Oil, body:					
Herring	-	-	2/	34	5,235
Menhaden 3/	32,298	31,361	38,130	35,877	337,815
Sardine, Pacific	-	-	-	148	167
Tuna and mackerel	214	375	1,395	1,735	5,175
Other (including whale)	1,889	1,682	2,833	2,868	7,396
Total oil	34,401	33,428	42,158	40,880	255,808

1/ Preliminary figures.
2/ Included in "other" or "unclassified."
3/ Includes a small quantity of dorsal finning.
4/ Not available on a monthly basis.

Source: Bureau of Fish Research, 1963. Fish oil is shown in pounds instead of oil-tons. Conversion factor: 2.25 weight equal 1 oil-ton.

1/Preliminary data.

2/Included in "other" or "unclassified."

3/Included a small quantity of thread herring.

4/Not available on a monthly basis.

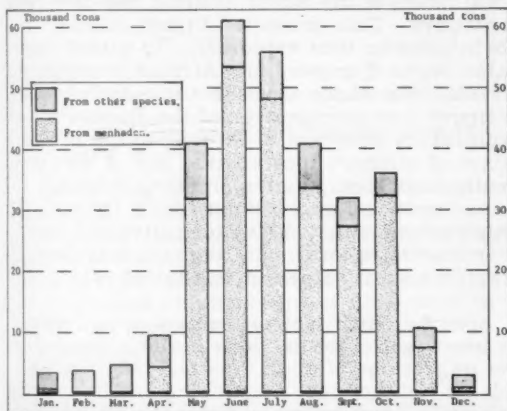
Note: Beginning with February 1963, fish oil is shown in pounds instead of gallons. Conversion factor, 7.75 pounds equal 1 gallon.



A purse seiner in the Gulf of Mexico with a full load of menhaden.

The quantity of fish meal processed during the first 5 months of 1963 amounted to 55,656 tons--5,009 tons less than the same period of the previous year. Marine-animal oil amounted to 42.2 million pounds--1.5 million pounds greater than the same period of 1962.

Production in 1962: During 1962, a total of 311,232 tons of fish meal, and over 255 million pounds of marine animal oils was produced in the United States. Compared with the previous year, the total meal and scrap production remained on nearly the same level as in 1961. Menhaden meal accounted for 77 percent of the total meal production. The production of scrap and meal would have exceeded the 1961 record production by several thousand tons had not bad weather caused an abrupt termination of the North Carolina fall fishery. Producers of fish meal and scrap had a satisfactory year in 1962. Prices were good despite the near record domestic production and the sharply increased volume of imports.



United States production (by months) of fish meal, 1962.

Marine animal oil production showed a decrease of nearly 11 million pounds compared with 1961. Menhaden oil amounted to 238 million pounds or 93 percent of the total oil production. Unlike the meal market, there was some difficulty in marketing fish oil.

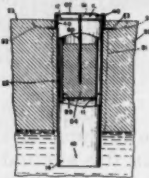
Solubles and homogenized condensed fish production increased from 112,000 tons in 1961 to over 124,000 tons in 1962. As in 1961, some solubles were processed into fish meal rather than being sold separately. Prices were good, tending to follow those of fish meal.



Inventions

NEW ICE-FISHING AID PATENTED:

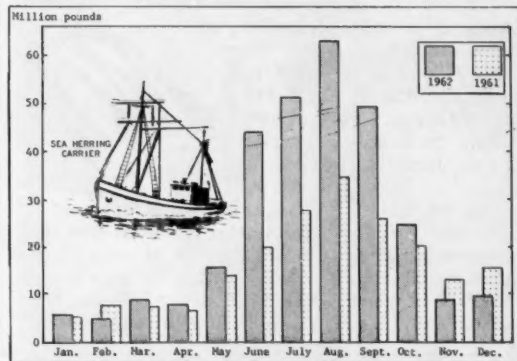
The inventor of a new ice-fishing aid claims that it is only necessary to chop one hole in the ice all season when his device is used. The invention includes a can which is allowed to freeze in an ice hole, and a wick arrangement which can be burned to loosen the ice core within the can. The device is said to have been tested successfully in the field. (Patent Number 3,056,272, U. S. Patent Office Classification Number 62-355, granted Ervin F. Eilers, 1284 Hartford Ave., St. Paul 16, Minn.)



Maine

FISHERY LANDINGS, 1962:

Landings of fish and shellfish at Maine ports in 1962 amounted to 294.3 million pounds valued at \$20.4 million. Compared with 1961, this was a gain of 96.4 million pounds or 49 percent in volume, and \$1.3 million or 7 percent in value.



Landings at Maine ports by months, 1962 and 1961.

Sea herring landings of 156.7 million pounds in 1962 were up 102 million pounds from 1961. Ocean perch (69.5 million pounds) landings declined 7.9 million pounds from the preceding year. Seventy-seven percent of the year's total landings consisted of those two species. The Maine lobster catch (22.1 million pounds) in 1962 was up 1.2 million pounds and the whiting catch (17.8 million pounds) gained 3.7 million pounds as compared with 1961.

Knox County led all counties in the 1962 production with 96.3 million pounds. Cumberland County was second in volume with 82.7 million pounds, and Washington County third with 54.5 million pounds. Hancock County contributed 38.2 million pounds, and Lincoln, Sagadahoc, and York Counties furnished 10.6, 10.4, and 1.6 million pounds, respectively.

August landings (63.8 million pounds) were the highest of any month of the year. July was the second highest month in production, 51 million pounds; September followed with 49.5 million pounds, and June 44.1 million pounds.

Imports of Canadian sea herring through Maine ports during 1962 amounted to 62.1 million pounds--17 percent above 1961. Imports during August, September, October, and July totaled 46 million pounds or 74 percent of the year's total imports.



Maine Sardines

CANNED STOCKS, JUNE 1, 1963:

Current canned stocks reflect the recovery of the Maine sardine industry in 1962. Cannermen's stocks of Maine sardines on June 1, 1963, were 486,000 cases greater than those of June 1, 1962, but only 242,000 cases above stocks on hand two years ago on June 1, 1961.



On April 15, 1963, carryover stocks at the cannermen's level amounted to about 660,000 cases compared to a carryover of only 33,000 cases on April 15, 1962. But 1962 was a short-pack year. The Maine sardine pack during April 15-June 30, 1963, amounted to

232,000 cases, compared with 452,000 cases during the same period in 1962.

The usual 7½-month Maine sardine packing season opened on April 15 in 1963. The 1962 season was extended to 13 months--Dec. 2, 1961-Jan. 1, 1963--but the 1962 pack canned before April 15 was insignificant.

Note: See Commercial Fisheries Review, June 1963 p. 35.



North Atlantic Fisheries

Exploration and Gear Research

TUNA STOCKS IN NORTH ATLANTIC SURVEYED:

M/V "Delaware" Cruise 63-4 (April 22-June 10, 1963): This tuna exploratory cruise was the eleventh and most extensive of the tuna exploration trips conducted by the U.S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware since 1955. Nearly 5,500 miles of the North Atlantic was covered in 50 days. This projected United States North Atlantic tuna exploration to within 300 miles of the European and African Continents. Investigation of the tunas in areas indicated in figure 1 is an extension of the Bureau's exploratory program to determine the full extent of offshore tuna stocks, and of the continuing biological studies on North Atlantic tunas conducted by the Woods Hole Oceanographic Institution. The Committee for Research and Exploration of the National Geographic Society joined in this latest effort.

Specific objectives of the cruise included an investigation of the distribution, abundance, and migrations of adult tuna and other large pelagic fish by long-line fishing and by tagging fish not needed for other purposes. Biological examination and collection of specimens taken aboard supported the following studies:

Canned Maine Sardines--Wholesale Distributors' and Cannermen's Stocks, June 1, 1963, with Comparisons^{1/}

Type	Unit	1962/63 Season				1961/62 Season				1960/61 Season	
		6/1/63	4/1/63	1/1/63	11/1/62	7/1/62	6/1/62	4/1/62	1/1/62	11/1/61	7/1/61
Distributors	1,000 actual cases	215	264	271	230	134	99	148	193	202	208
Cannermen	1,000 std. cases ^{2/}	536	699	1,092	1,348	374	50	45	144	221	201

^{1/}Table represents marketing season from November 1-October 31.

^{2/}100 3¼-oz. cans equal one standard case.

Note: Beginning with the "Canned Food Report" of April 1, 1963, U.S. Bureau of the Census estimates of distributors' stocks were based on a revised sample of merchant wholesalers and warehouses of retail multiunit organizations. The revised sample resulted in better coverage. The January 1, 1963, survey was conducted with both samples to provide an approximate measure of the difference in the two samples. That survey showed that the estimate of distributors' stocks of canned Maine sardines from the revised sample was 13 percent above that given by the old sample.

Source: U.S. Bureau of the Census, "Canned Food Report," June 1, 1963.



Yellowfin tuna

reproductive maturation, morphometry and meristics, growth determination by analysis of hard parts, anatomical differentiation of species, parasitic host specificity, and sub-population differentiation by dissection and serological analysis.

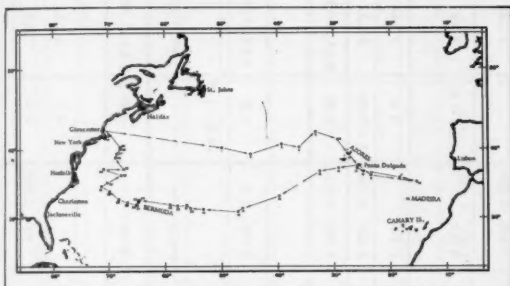


Fig. 1 - Area of operations during M/V Delaware Cruise 63-4, April 22-June 10, 1963.

Of 30 long-line sets completed during the cruise, 24 were daylight sets and 6 were night sets. Gear consisted of Japanese-type long-line with 160-fathom "baskets" of 7-hook design. Floatline depths were varied to determine relationships of tuna catch to depth and temperature; four bathythermograph casts were taken at each long-line station.



Fig. 2 - The U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware operates out of the Bureau's Exploratory Fishing Base at Gloucester, Mass. Since 1957, this vessel conducted 9 tuna long-line exploratory cruises in oceanic areas of the North Atlantic.

The most significant tuna catches were made in areas adjacent to the Azores Islands and the American Continental Shelf. Big-eyed tuna (*Thunnus obesus*) dominated the catch in the eastern North Atlantic area, yellowfin tuna (*T. albacares*) in the waters of the mid-North Atlantic and Gulf Stream, and bluefin tuna (*T. thynnus*) were caught in greatest numbers at the edge of the Continental Shelf south of Cape Cod. Few albacore (*T. alalunga*) and no blackfin tuna (*T. atlanticus*) or skip-jack (*Katsuwonus pelamis*) were caught during the cruise.

A concentration of medium bluefin tuna (average weight 113 pounds) was located at Station 38. Of the 47 bluefin at that station, 29 were released with multiple tags to facilitate an early possible return from the East Coast tuna purse-seine fishery during the 1963 season. A later report confirmed the recapture of one of those fish in a purse-seine catch off Ocean City, Md., on June 27, 20 days and 325 miles to the west of its release location. A single 400-pound bluefin caught west of the Azores at Station 4 was of particular interest because of its location



Fig. 3 - Measurements of this giant bluefin tuna (about 400 pounds) were a small part of the scientific data taken from each tuna landed on the Delaware's deck. Note the plastic tag on the fish's side applied at the rail before bringing the tuna to gaff.

Station Data and Catches for M/V Delaware Cruise 63-4.

Sta. No.	Date 1963	Time	Position		Gear & Set No.	No. of Hooks	Tuna	Sharks	Misc. Fish	Surf. Temp. °F	Remarks
			Lat.	Long.							
1.	27-IV	0645-1510	40-09N	49-54W	LL#1	420	3 BE, 1 A	2 B	8 LL	63.1	
2.	29-IV	0650-1430	39-20N	44-50W	LL#2	420	4 BE		2 LL, 1 R	59.9-60.8	
3.	30-IV	1730-1815	40-40N	39-20W	MWT#1					64.5	
4.	1-V	0630-1435	40-17N	36-07W	LL#3	546	4 BE, 1 BF	3 B	1 LL, 1 SL	60.2-62.1	
5.	2-V	0625-1440	42-18N	33-15W	LL#4	546	1 BE	5 B		57.0-60.0	1 BE - Tagged 1 BE - Lost
6.	3-V 4-V	1805- -1050	41-20N	29-20W	LL#5, DNNL	560	2 BE	18 B	2 SW, 1 LL 1 Opah	59.0-59.7	SW Wt. -230
7.	4-V	2125-2155	39-27N	27-35W	MWT#2					61.3	
8.	5-V	0615-1535	39-15N	27-25W	LL#6	560	5 BE	3 B, 2 M		60.4-62.0	2 BE - Tagged
9.	8-V	0635-1530	36-20N	23-30W	LL#7	567	8 BE, 1 A	2 B	2 LL	62.4-65.3	6 BE - Tagged
10.	10-V	0910-1515	35-23N	15-26W	LL#8	420		1 B		61.9	
11.	11-V	0630-1500	36-00N	18-20W	LL#9	560	7 BE	1 B	1 LL	62.8-63.9	5 BE - Tagged 1 BE - Lost
12.	12-V 13-V	2040-2115 0425-1100	36-57N	24-50W	MWT#3 LL#10 DNNL	420	7 BE, 6 BF		1 LL	65.3 65.3	5 BE - Tagged 2 BF - Tagged
13.	13-V 14-V	1830- -0845	37-25N	25-55W	LL#11 DNNL	280	4 BE	8 B, 1 M	3 SW	64.6-66.0	2 BE - Tagged 1 BE - Lost SW Wt. -707
14.	16-V	0610-1335	37-25N	29-10W	LL#12	420	2 BE	4 B	1 LL	64.4-65.3	1 BE - Tagged
15.	17-V	0400-1110	36-55N	32-32W	LL#13	413	1 A	3 B	2 LL	65.1-65.9	
16.	19-V	0410-1110	33-20N	39-50W	LL#14	420	1 YF	6 B	4 LL, 1 SL	68.9-69.1	1 Tuna - Lost, No ID
17.	20-V	2120-2220	31-36N	46-15W	MWT#4 DNNL					71.6	
18.	21-V	0555-1320	31-00N	47-05W	LL#15	420	1 YF, 1 A	3 B	1 LL, 1 D	70.9-72.7	
19.	22-V 23-V	2110- -1100	30-25N	53-20W	LL#16 DNNL	420		10 B, 1 W		71.4-72.0	1 Tuna - Lost, No ID
20.	23-V	2300-2400	31-38N	55-38W	DNNL					73.4	
21.	24-V	0605-1320	32-00N	56-10W	LL#17	420	2 YF	1 B	6 LL, 1 WM	71.2-72.1	
22.	24-V	2300-2400	31-55N	57-52W	DNNL					71.8	
23.	25-V	0605-1340	32-05N	59-10W	LL#18	420		4 B	4 LL	71.2-71.8	
24.	26-V 27-V	1855- -0825	32-45N	64-36W	LL#19 DNNL	280	1 YF, 2 BE	5 B	1 LL	72.0-72.2	

25.	30-V	1600-1630	32-30N	64-45W	Vert. Pktn.				72.7	
26.	30-V	2300-	32-01N	65-10W	Vert. LL DNNL			1 G		
27.	31-V	0610-1150	32-00N	65-07W	LL#20	280		1 B, 1 T	73.4-74.9	
28.	31-V	2045-2200	32-22N	66-45W	DNNL				73.0	
29.	1-VI	0610-1340	32-50N	68-15W	LL#21	420		4 YF, 3 A	73.0-73.2	3 YF - Tagged
30.	1-VI	2100-2230	34-03N	69-53W	DNNL				72.3	
31.	2-VI	0610-1515	34-45N	71-15W	LL#22	560		9 YF	72.3-72.5	3 YF - Tagged 2 Tuna - Lost, No ID
32.	2-VI	2100-2230	35-18N	70-17W	DNNL				69.8	
33.	3-VI	0610-1505	36-27N	67-50W	LL#23	560		6 YF, 2 BF	69.6-69.8	4 YF - Tagged
34.	4-VI	0615-1515	37-15N	70-57W	LL#24	420		9 YF, 5 BF 2 D	68.9-77.9	3 YF - Tagged 1 WM - Tagged
35.	5-VI	0610-1345	37-17N	67-25W	LL#25	420		2 YF, 1 BF 3 S	76.6-78.1	2 YF - Tagged
36.	6-VI	0615-1454	38-48N	68-53W	LL#26	560		3 BF, 3 BE	66.4-67.7	1 BF - Tagged 2 BE - Tagged 1 BF - Lost
37.	6-VI 7-VI 7-VI	2140- 1135 0620-1445	39-23N	68-33W	LL#27 DNNL LL#28	280 280		5 BF, 1 BE 6 B, 1 M	61.7-64.0 62.9-63.9	1 BF - Tagged SW Wt. = 183 4 BF - Tagged
38.	8-VI	0605-1425	40-00N	68-00W	LL#29	420		47 BF, 2 BE	59.7-61.9	29 BF - Tagged 2 BE - Tagged 6 Tuna - Lost, No ID
39.	8-VI 9-VI	1915- 0950	40-19N	68-00W	LL#30 DNNL	420		6 BF	60.1-64.6	4 BF - Tagged 1 SW - Tagged 2 SW - Lost SW Wt. = 2,636
Totals						13,132		80 BF, 55 BE 35 YF, 7 A 45, 2 D		41 BF - Tagged 26 BE - Tagged 15 YF - Tagged 1 WM - Tagged 2 SW - Tagged 3 BE - Lost 1 BF - Lost 2 SW - Lost 10 Tuna - Lost, No ID

1/1/63 tagged and released are included in the catch; fish lost at the rail are not included in the catch.
 Abbreviations: Gear: LI = Long-line; MWT = Mid-water trawl; DDNL = Dip net-night light; Vert. Pktn = Vertical plankton tow.
 Tuna: BF = Bluefin; BE = Bigeye; YF = Yellowfin; A = Albacore.
 Sharks: B = Blue; M = Mako; W = White-tip; T = Tiger; S = Sickle; D = Dusky.
 Misc. Fishes: WM = White marlin; C = Cownose ray; SW = Swordfish; D = Dolphin;
 Note: Roman numerals in date column designate the month.

midway between western and eastern North Atlantic bluefin populations.

Six giant bluefin at Station 12 were the only eastern North Atlantic tunas of that species taken on the cruise; two were tagged and released. The remainder received detailed biological examination aboard the vessel. Giant bluefin occurred in waters of mean surface temperatures (61.0°-77.3° F.) ranging above those where medium and small bluefin were caught (60.8°-62.8° F.).

Yellowfin tuna were not found in any concentrations but were noted to be taken only in warmer waters (68.9°-78.1° F. surface temperature). The larger yellowfin (over 100 pounds) generally appeared in waters of mean surface temperatures 69.0°-73.0° F., while the smaller fish (under 100 pounds) generally occurred in waters of mean surface temperatures 73.0°-77.3° F.

Big-eyed tuna were not taken in large quantity but appeared scattered in small numbers throughout the cruise in waters of mean surface temperatures ranging from 58.5° to 67.0° F. The vessel's big-eyed tuna catch in the vicinity of the Azores reflected the catches by the Azorean live-bait tuna fishery which was in season at the time.

Significant differences in catch composition were noted between day and night sets of long-line gear. Twenty-seven swordfish (*Xiphias gladius*) were taken exclusively on night sets. A catch of 18 swordfish from 420 hooks on June 8 at the mouth of Oceanographer Canyon (130 miles southeast of Cape Cod) indicated an abundance of those fish in an area farther east than that in which the vessels of the new commercial long-line fishery were operating at that time. This information was promptly transmitted to United States long-line vessels within radio range. One swordfish was multiple-tagged with seven dart-type plastic tags. While the night tuna catch showed little or no change from day sets, the blue shark catch (*Prionace glauca*) was considerably higher. No shark damage to the tuna or swordfish was encountered on those sets.

Other species of particular scientific interest taken by long-line included the long-nose lancetfish (*Alepisaurus ferox*), the short-nose lancetfish (*A. brevirostris*), the pelagic ray (*Dasyatis* sp.), the dolphin (*Coryphaena hippurus*), the sharp-tailed sunfish (*Mola*

lanceolata), the white marlin (*Makaira alba*), a snake mackerel (*Gempylidae*), the opah (*Lampris regius*), the mako shark (*Isurus oxyrinchus*), the whitetip shark (*Carcharhinus longimanus*), the sickle shark (*C. falciformis*), the dusky shark (*C. obscurus*), and the tiger shark (*Galeocerdo cuvieri*).

As a supplement to long-line fishing data and specimen examination, 208 bathythermograph casts were taken, 4 midwater-trawl tows and 14 dipnet-night light stations were made, vertical plankton hauls and Van Doren water hauls to sample chlorophyll levels were taken at each long-line station. Blood samples from 57 specimens of tuna and swordfish were collected and shipped to the Bureau's subpopulation study program at the Honolulu Biological Laboratory in Hawaii.

Three hydrographic transects across the Gulf Stream by the Bureau's research vessel *Geronimo* from the Biological Laboratory at Washington, D. C., preceded the arrival of the *Delaware* in the area east of Cape Hatteras and Cape May. Data from those transects assisted in locating several long-line stations in desirable thermal conditions.

In cooperation with other institutions, materials for further study were collected as follows during this cruise: tuna skeletons for studies on the comparative anatomy and systematics of the tunas of genus *Thunnus* at the Bureau's Ichthyological Laboratory in Washington, D. C.; marlins, squids, and octopi for the University of Miami Marine Laboratory; bathpelagic fishes for the Museum of Comparative Zoology at Harvard University; hearts of sharks and tunas for arteriosclerosis studies at Centre d'Etude des Maladies des Arteres Coronaires, Brussels, Belgium; flying fish and shark remoras for the U. S. National Museum; sauries for the Scripps Institution of Oceanography; parasitic copepods of tuna and shark for the Department of Biology, Boston University; and tuna parasites for the Federal Institute for Fisheries Research at Hamburg-Altona, Germany.

Two port calls at Ponta Delgada, Azores, and one call at the U. S. Naval Station, Bermuda, were made for bunkering fuel, food and water, and exchanging scientific personnel.

Scientific personnel aboard the *Delaware* during this cruise included guest cooperators from Canada, Norway, Madeira, Portugal, West Germany, and the United States.

Note: See *Commercial Fisheries Review*, June 1963 p. 38.



North Atlantic Fisheries Investigations

SURVEY OF SEA SCALLOP POPULATION ON GEORGES BANK:

M/V "Albatross IV" Cruise 63-3 (June 10-13, 1963): To collect samples to determine the average size and age of the sea scallop population on the western part of Georges Bank was the main purpose of this cruise by the U. S. Bureau of Commercial Fisheries research vessel Albatross IV.

The cruise was divided into two parts. During the first half of the survey, 65 stations were occupied, and during the second half, 96 stations were sampled. A 10-foot scallop dredge with a 2-inch ring bag was used at all stations. The gear handled easily and efficiently over the stern ramp of the Albatross IV. Hydrographic data were collected at each station and at hourly intervals while steaming.

The Bureau's newest research vessel during Cruise 63-1 (May 13-17, 1963) collected quantitative samples of sea scallops from the western side of Georges Bank. Only 65 stations were occupied with the 10-foot scallop dredge because of a mechanical breakdown in the gantry used for setting and retrieving the dredge. During Cruise 63-2 (May 25-June 6, 1963), the Albatross IV proceeded to Washington, D. C., to show the vessel to interested groups and the general public. On its return trip from Washington, D. C., to Woods Hole, Mass., the vessel demonstrated the collection of fisheries and hydrographic data to the press.

North Carolina

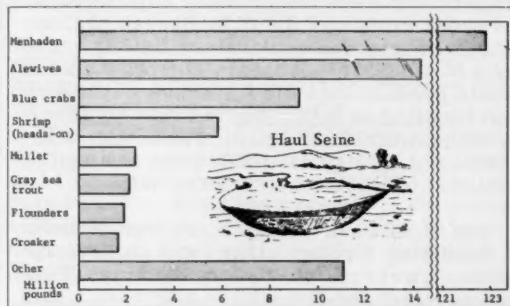
FISHERY LANDINGS, 1962:

Landings of fish and shellfish in North Carolina during 1962 amounted to 174.3 million pounds, 102.3 million pounds (37 percent) below 1961. The production of food fish was 6 percent above the previous year, but excluding alewives, landings of the more valuable species were less than in any year since the program for collecting monthly landings data began in 1955. Shellfish production declined 6 percent below 1961.

The 1962 catch of hard blue crabs (12.2 million pounds) was 23 percent less than in 1961--the highest production year on record

for that species. The crab meat market was fairly good throughout the year, but a low meat yield for the greater part of 1962 reduced profits somewhat. Soft blue crab landings were slightly lower than in 1961.

Shrimp landings in 1962 amounted to 5.8 million pounds (heads-on), an increase of 2.8 million pounds over 1961. However, the 1962 shrimp catch was lower than the average for recent years.



North Carolina landings of certain fish and shellfish, 1962.

The landings of menhaden and thread herring used for reduction into fish meal, oil, and solubles were down 46 percent below the previous year. The menhaden catch dropped 99 million pounds (45 percent) and no thread herring was landed in 1962. Although more vessels operated in the fall menhaden fishery, the weather for a period of 3 successive weeks during November and December was too windy for vessels to leave the docks. The 1962 price of fish meal was somewhat better than in 1961, and the oil price was stronger by the end of the season.

Sea bass landings (1.3 million pounds) in 1962 increased 103 percent as compared with 1961. The greater portion of those landings was taken by otter trawls.

The 1962 oyster production of 961,000 pounds was down 20 percent. Approximately three-fourths of the decline was in the Pamlico Sound area, where oysters are normally more abundant. Prices were high for both shell and shucked oysters throughout the year.



North Pacific Exploratory Fishery Program

"OFF-BOTTOM" TRAWLING INVESTIGATED:

M/V "John N. Cobb" Cruise 59: To develop techniques of fishing trawls just off the bottom, and also evaluate the fish catching efficiency of "off-bottom" trawls compared to that of conventional "on-bottom" otter trawls were the primary objectives of a 4-week cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb. A secondary objective was to locate grounds suitable for conventional bottom trawling in rocky regions now avoided by commercial fishermen. The cruise was completed on May 31, 1963, when the vessel returned to its base in Seattle, Wash.

The first week of the cruise was devoted to modifying a pelagic trawl and an Eastern bottom trawl for "off-bottom" fishing. This was accomplished by adding additional floats to the head ropes and rib lines, and hanging sash weights at the ends of 1-fathom droppers from the wings of each net.

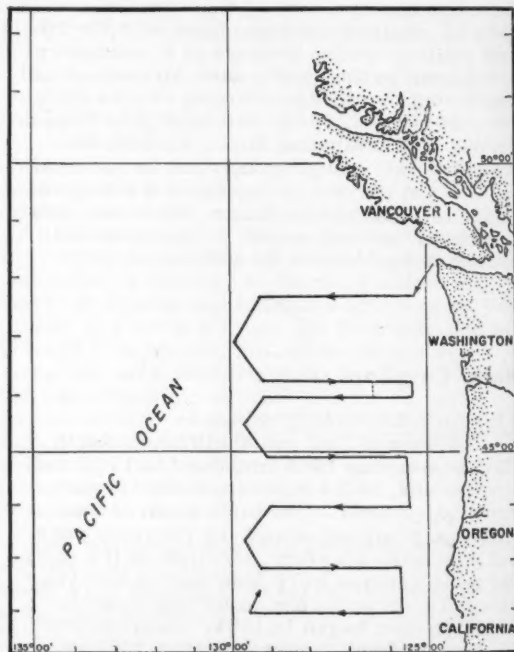
The efficiency of the 2 off-bottom trawls was compared to that of the standard Eastern on-bottom trawl during the middle 2 weeks of the cruise by making hauls with the different trawls over the same grounds. A total of 32 sets was made--12 with the off-bottom pelagic trawl, 10 with the off-bottom Eastern trawl, and 10 with the on-bottom Eastern trawl. Catches of fish with the off-bottom trawls were smaller than with on-bottom trawls. The average catch per hour of trawling with the on-bottom gear was 1,816 pounds; with the off-bottom pelagic trawl, 190 pounds; and with the off-bottom Eastern trawl, 142 pounds. The off-bottom catches were characterized by a dominance of rockfish and other roundfish, and an absence of flatfish, sharks, and skates. About 99 percent of the off-bottom pelagic trawl catch and 78 percent of the off-bottom Eastern trawl catch consisted of rockfish and other roundfish, compared to 48 percent in the on-bottom Eastern trawl. Species most often caught in the off-bottom trawls were Pacific ocean perch (*Sebastes alutus*), yellow-tailed rockfish (*Sebastes flavidus*), whiting (*Theragra chalcogrammus*), and Pacific hake (*Merluccius productus*).

During the last week of the cruise, precision echo-sounding surveys were made to

determine if trawlable grounds existed in certain rocky regions off the Washington coast. Only a few new fishing areas were found and they were too small to be of use to the commercial fleet. But in 1 locality, a known area was expanded into a longer tow about 8 miles long.

ABUNDANCE AND DISTRIBUTION OF ALBACORE TUNA AND OTHER PELAGIC SPECIES TO BE STUDIED:

M/V "John N. Cobb" Cruise 60 (July 8-28, 1963): To obtain information on the relative abundance and distribution of albacore tuna and other pelagic species of fish is the primary objective of this cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb. The area to be investigated covers the waters between 48° and 42° N. latitude and seaward to 130° W. longitude. Oceanographic data, including salinity, oxygen, and chlorophyll determinations also are to be obtained during the survey.



Track line of the John N. Cobb Cruise 60, July 8-28, 1963.

Trolling is the primary method to be used for catching albacore. Any albacore taken in suitable condition is to be tagged, measured,

and released. Information on albacore catches is to be broadcast by radio to the commercial fishing fleet. Night-lighting stations will be conducted to make observations of marine life and forage organisms.

In cooperation with personnel from Scripps Institution of Oceanography (La Jolla) and the Bureau of Commercial Fisheries (San Diego), standard oceanographic stations are to be occupied daily along the track line.



Oceanography

KEEL LAID FOR RESEARCH VESSEL "OCEANOGRAPHER:"

On July 22, 1963, keel-laying ceremonies were held for the first of two Class I Oceanographic Survey Ships to be built at a shipyard in Jacksonville, Fla., for the U. S. Coast and Geodetic Survey.

The vessel, to be known as the Oceanographer, will be the largest ever built in the United States for the express purpose of deep-sea oceanographic survey and research work. It will be 303 feet long, with 52-foot beam, and a loaded displacement tonnage of approximately 3,800 tons. Of welded steel construction, with Diesel-electric twin-screw propulsion, it will have a service speed of 16 knots and a cruising range of 16,000 nautical miles.

The main propulsion and principal auxiliary machinery and associated equipment will be automated by a centralized engine-room control system. A unique feature of the system is the use of a computer in the control section. This means additional automated functions can be incorporated in the future. The computer will also be available to process scientific information.

The Oceanographer will be strengthened for navigation in ice and will have extensive specialized electronic and mechanical equipment for oceanographic, meteorological, and geophysical observations. All scientific working areas will be air conditioned and served by interconnecting wireway trunks and communication facilities.

Running vertically through the vessel will be a center well through which experimental equipment can be lowered, and which can

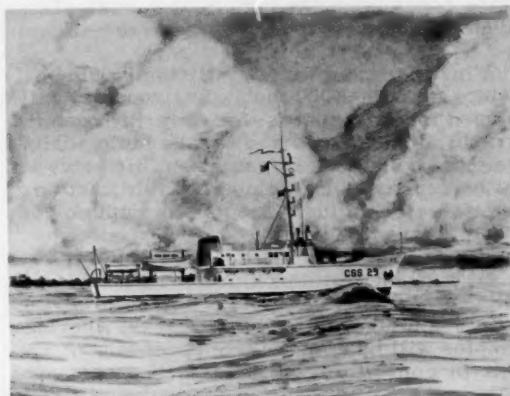
serve as a comfortable entrance and exit for SCUBA-diving explorers. Viewing ports below the waterline in the bow will permit underwater observations. Laboratory space of over 4,100 square feet will be provided.

The vessel will be built to carry a normal complement of 13 officers and 72 crewmen. It will have additional accommodations for as many as 20 scientists. (U. S. Coast and Geodetic Survey, July 22, 1963.)

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NEW COAST AND GEODETIC SURVEY RESEARCH VESSELS "PEIRCE" AND "WHITING" ENTER SERVICE:

The new Class III Coastal Survey Vessel Whiting was commissioned by the U. S. Coast and Geodetic Survey at New Orleans, La., on July 8, 1963. After the ceremony, the vessel sailed to Norfolk, Va., for outfitting before beginning its first assignment in Nantucket Sound.



Artist's drawing of the Whiting, one of the new Coast and Geodetic Survey vessels.

The Whiting is a sistership of the Peirce which was commissioned early in 1963. The Peirce was scheduled to begin its first hydrographic investigation off Charleston, S. C., in late July 1963. Part of that area has not been surveyed since the turn of the century.

Note: See Commercial Fisheries Review, February 1963 p. 45 and November 1962 p. 36.

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NEW RESEARCH VESSEL COMMISSIONED FOR MIAMI UNIVERSITY:

A new oceanographic research vessel for the University of Miami's Institute of Marine

Science was commissioned on July 9, 1963. The vessel was named John Elliott Pillsbury in honor of an outstanding 19th century oceanographer who, between 1885 and 1890, made important observations and measurements of the velocity and structure of the Gulf Stream.

The vessel was converted for oceanographic research from a surplus U. S. Army freight and supply vessel. She is 176.5 feet long, has a beam of 32 feet, a draft of 14 feet, and is powered by two 500 hp. Diesels. She is designed for a cruising speed of 12 knots, a top speed of 14 knots, and a cruising range of 2,500 miles. Equipment includes radio, radar, and a precision depth-recorder. The vessel is air conditioned throughout and has laboratories both above and below decks.

An electro-hydraulic trawl winch, which will handle 12,500 meters (about 42,000 feet) of tapered cable, has been installed. This winch will be used for deep-water trawling, dredging, and photography and is capable of taking cores from the bottom at a depth of seven miles below the surface.

A hydrographic winch, utilizing 9,000 meters (about 30,000 feet) of wire cable, will be used for light trawls, for lowering oceanographic instruments and to take biological, geological, and water samples. This cable can be replaced by an electric cable used to lower electronic instruments to a depth of 1,000 meters (3,280 feet).

A "wet" laboratory on deck will do the initial processing of samples before lowering to the main laboratory, below decks, where samples will be completely processed. A built-in cold-storage freezer will preserve deep-water cores that are not analyzed aboard ship.

Forward of the main laboratory is the "hot" lab where Carbon-14 tests can be made. This radioactive material is used for measuring the rate at which microscopic plankton plants produce organic material in the ocean.

Below the main laboratory are the transducers used for echo-sounding. In order to minimize the effect of engine and shipboard noise and to provide the highest degree of accuracy in echo-sounding data, the sensitive transducers can be lowered on stainless steel columns to a point 12 feet below the bottom of the hull. The precision echo-sounding apparatus is capable of obtaining highly ac-

curate profiles of the ocean floor and its sub-bottom structure.

The vessel will be used principally in off-shore waters from Miami south through the Caribbean to Brazil, and east to West Africa. Her first oceanographic cruise will be as a participant in EQUALANT II, an international survey of the Equatorial Atlantic.

Later in 1963, she will be used in an investigation of a little-known topographic feature of the deep sea bottom known as the abyssal hills. This study will include the taking of bottom cores of preglacial sediments to further our knowledge of changing conditions throughout the Pleistocene epoch.

Future work of the vessel will include: current measurements, deep-sea coring for paleo temperatures, deep-sea collecting of biological specimens, collecting of specimens for studies of the life histories of the billfishes and other pelagic fishes, and other oceanographic functions. (News of Institute of Marine Science, June 21, 1963.)

* * * * *

SEA FLOOR TO BE STUDIED:

The Institute of Marine Science, University of Miami, has received a research grant of \$230,000 for a one-year study of the deep-sea bottom in the Atlantic and Caribbean.

A major purpose of the deep-sea project is to learn more about the origin, composition, and topography of the abyssal hills. Little is known of the nature of those hills, which average about 1,200 feet high and cover about half of the entire ocean floor. Nothing is known of their origin. Some geologists suspect that the hills may have been formed by the deeper oceanic crust, which will also be studied by the University of Miami investigators.

The scientist in charge of the study stated that engineering and other technological problems have barred effective study of the abyssal hills in the past. "They are too small to be studied by the seismic refraction techniques currently used," he said. "Many are so steep that it is difficult to determine their shape by echo-sounders. Furthermore, until recently, an individual hill could rarely if ever be revisited since navigation techniques were too slow and unprecise. Now, taut wire buoys are relatively simple to install and bottom

sampling devices can be more reliably located on selected parts of the sea floor."

Operating from the Institute's newly-converted research vessel John E. Pillsbury, scientists will investigate in detail some "typical" abyssal hill fields between Bermuda and Puerto Rico. The distribution of hills within selected areas will be studied and the shapes of certain individual hills investigated in detail with a view to mapping their topography. Through the use of coring devices which sink into the bottom and capture sediments, the composition of hills and surrounding areas will be studied.

Investigators will also attempt to obtain deep-sea cores of undisturbed sediments extending back a million years to preglacial periods. Thorough analysis of such cores could reveal the pattern of changing conditions through the Pleistocene geologic epoch and thus provide an invaluable frame of reference for the whole field of Pleistocene science. One of the best places to obtain such cores--which will be some 60 feet in length--is in certain areas of the Caribbean. (News of Institute of Marine Science, June 5, 1963.)

UNIVERSITY OF MIAMI ADDS NEW RESEARCH AND TRAINING UNIT:

Early in 1963, a Division of Marine Technology was established by the Institute of Marine Science, University of Miami. The new division will train oceanographic engineers and will perform research and development in many areas of marine technology. The new unit has already received contracts for projects ranging from antisubmarine warfare systems to studies of the effects of high-speed erosion upon the antifouling coatings of hydrofoils.

The curriculum of the Division of Marine Technology, when taken along with regular graduate physics or engineering courses, will provide students with a sophisticated approach to problems of oceanographic instrumentation, deep-sea drilling, underwater photography and television, underwater warfare systems, navigational systems, instrumented buoys, manned or unmanned submarines, pollution, fouling and corrosion, and related fields. It includes regular graduate courses in general oceanography, in its physical, chemical, geological, and biological

aspects, and special courses in physical oceanography. Students will acquire practical experience through time spent at sea aboard Institute of Marine Science research vessels as members of staff research teams. A series of seminars on such subjects as underwater sound, fluid mechanics, mass and heat transfer, instrumentation, military requirements in underwater warfare, will also be offered. The faculty of the new division is drawn from over 150 scientists engaged at the Institute in all branches of oceanographic research.

The Division of Marine Technology does not represent an entirely new activity for the University of Miami. For several years, the University's Institute of Marine Science has been engaged in research in underwater acoustics. Staff members have also invented a number of oceanographic instruments and devices, including large deep-sea sterile samplers for microbiological use; a portable laboratory for transfer to and from seagoing ships; a 2-ton deep-sea water sampler; a current-measuring device and various biological sampling devices and net-metering recorders.

Facilities for the initial operations of the new division are already available at the Institute on Virginia Key, Miami, Fla. The 178-foot research vessel John E. Pillsbury has recently been added to the Institute's seagoing facilities. Additional laboratory, workshop, and lecture space will be provided through cooperation with the School of Engineering and through buildings soon to be erected. (News of Institute of Marine Science, June 5, 1963.)



Oysters

MARYLAND OBSERVATIONS FOR 1963:

Information on oyster growth and allied data will again be issued this year in a series of mimeographed oyster reports issued each year by the Chesapeake Biological Laboratory at Solomons, Md. Information on the summer spatfall, fouling of shells, oyster growth and condition, oyster mortality, hydrographic conditions, and general biological information will be included. Observations by staff biologists of the Institute and of the Department of Tidewater Fisheries, by the laboratories of the U. S. Bureau of Commercial Fisheries, by the Virginia Institute of Marine Science, by members of the industry and others will be drawn upon for pertinent material when available. The following are excerpts from Bulletin No. 1 of June 24, 1963:

The 1962 Spatfall: Last September's bulletin summarized the spat counts to that date on test shells exposed during 1962 at various locations in Maryland. At most stations little additional spatfall occurred except a continuation of the light fall set in the Patuxent and a few scattered spat in

Holland Straits and Tar Bay. As previously reported, test shells indicated a good initial set at the southern entrance to Holland Straits, in Hooper Straits, in Tar Bay, at Barren Island, Punch Island Creek and Seminary Bar in St. Marys.

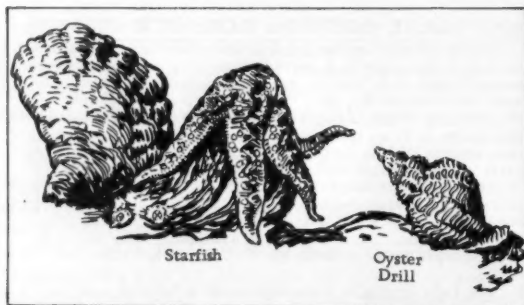
Since test shells only remain overboard for one week, the counts on them represent a potential set of seed oysters but not the surviving set. The newly attached spat are extremely small. Most of them are visible only under a microscope and they are easily killed by a light film of silt, being overgrown by other animals, grazing by mud snails, invasion by oyster leeches, attack by drills, and physical crowding out by other spat when numbers per shell are high. Test shells indicate the time and relative intensity of oyster spat-fall and of fouling organisms that interfere with oyster setting in addition to showing the progress of setting during the season.

In order to evaluate the surviving set at the end of the growing season, a survey of planted shells, seed, and natural bar material is conducted jointly by laboratory and tide-water fishery personnel during the fall and early winter. To do this, random half bushel samples of bar material are taken and all spat, oysters, and other material counted or measured.

Some shells designed for seed production did not catch enough spat to justify using it as seed this year. However, the seed areas all have a history of good setting and should receive additional good future sets unless fouling on the year-old shells becomes excessive.

Except where oyster drills are present or bottom is marginal, seed with a count as low as 350 per bushel can produce approximately one bushel of marketable oysters for each bushel of seed in 2 to 3 years on good bottom in most of Maryland's Chesapeake oyster growing area. Counts of 1,000 or more are considered high-quality seed.

The counts taken are representative of the top shells or the seed that would be caught at the beginning of transplanting. As shells are caught the underneath ones form a larger part of the catch. These have fewer spat and a greater proportion will be completely buried and blank so that the average count will fall steadily as the seed is harvested. The proportion of the planted shells that can be utilized for seed is difficult to predict. On a hard shell bottom where none of the planted shells become buried, the harvest can approach 100 percent where the layer of shells is not more than a few inches thick. On a soft bottom more than half of the planted shells may be buried and produce no spat but will serve to form a support for future plantings so that the percent of harvestable shells will increase each year that the area is replanted until 100 percent may eventually be approached provided the bottom is not broken and the old shells that form the foundation are not disturbed.



Research shows that chemical controls and metal fences offer ways to check crabs, drills, and starfish--the principal enemies of oysters.

Some bottoms with high-setting potential are so located that they hold shells up well in normal weather but in exceptional storms may shift so that the shells become packed in the bottom and cannot easily be removed. The attached spat may be partially killed but those on the upper shell margins sometimes are able to make good growth so that they later become more easily caught as they reach above the bottom. Bottoms of this nature are more useful for seed purposes when the new set can be transplanted during the fall before the period of heavy winter winds.

Included in the observations are counts on cultch of natural bars in the upper Bay, Chester River, West side of Bay, Potomac and the upper portion of other major tributaries that were not shelled because their past record of spatfall has been too low to justify shelling. Such areas require plantings of seed and are included to show their low potential as spat producers.

Spat are never uniformly distributed and occasional failures occur even in areas that normally have high sets. In general, 1962 was a better than average setting year and most State shell plantings received satisfactory sets. The careful selection of areas for shelling and the timing of planting so that little fouling occurred before the time of spatfall both contributed greatly to the excellent average success of State shell plantings in 1962. In the bulletin of July 26, 1961, all of the recognized causes of oyster mortality in Maryland were reviewed and copies of that bulletin still are available upon request.

The winter of 1962/63 was accompanied by the heaviest so-called "Winter Kill" that we have observed. Many natural bars suffered little loss but in some instances, especially on thickly planted beds on poor-quality bottom, samples taken by biologists of the Department of Tidewater Fisheries and of the laboratory at Solomons were found to contain from 5 to as high as 30 percent dead oysters with meats during mid-March before water temperatures had risen enough to cause rapid decomposition. In addition to the dead oysters or "gapers," there were many recent "boxes" (pairs of empty shells) that contained few fouling organisms and probably also represented oysters that had died during the winter season.

Samples of these gapers, together with live oysters from the same beds, were examined at the laboratory for the parasite "MSX" but this was not found in any of them. The oysters were not cultured at this time for the fungus *Dermocystidium* since this parasite virtually disappears during the winter months. The living and dead oysters from the badly affected beds were extremely thin and in poor condition. None of the deaths appeared to be directly due to any of the known predators and parasites that sometimes cause serious oyster losses in this area.

Like other animals, oysters may die from a combination of unfavorable circumstances or "stress" that weakens them to the point where they can be overcome by factors that acting alone normally would not kill them. While much remains to be learned, the following factors are known that contributed greatly to the unusually poor condition of many oysters last season.

During 1962 water temperatures were unusually high from the end of April through June and salinities rose to above normal from late May on. This resulted in the earliest appearance of the fungus *Dermocystidium* that we have recorded and by July a very high percentage of oysters in the area from Solomons down were found to be infected with some samples containing as high as 85 percent infected oysters. However, from June on the summer was quite cool so that below normal water temperatures slowed down development of the fungus. This generally prevented buildup of the parasite in an infected oyster to the point where the oyster would die. Thus losses from the fungus that normally occur in late summer and early fall were less than usual in 1962 although a few substantial losses did occur where oysters were crowded. However, the many oysters that sur-

vived the fungus infection had not been able to fatten as well as uninfected oysters and were in a weakened condition at the end of the summer. This was an important factor in the exceptionally poor condition in which many oysters were found at the beginning of the 1962 fall oyster season.

A near record drought occurred last year from July through October. This resulted in fewer nutrient salts from the land reaching the Bay and thus there was a reduced bloom last fall of the tiny plants in the water upon which oysters feed. This was a second factor that, by reducing normal fall fattening, caused many oysters, except in areas far upstream, to enter the winter in very poor condition.

That the winter of 1962/63 was one of the longest and most severe for many years is well-known. In early December, water temperatures dropped well below the point at which oysters cease to feed and remained there continuously until mid-March. Oysters need to draw upon food stored in their body tissues when they are unable to feed. While this withdrawal is slow at low temperatures it still produces a steady decline in oyster condition or "fatness" during the winter as long as temperatures continue low. The unusual 1962/63 winter drain on the oysters' condition was a third factor to cause many oysters to become dangerously weakened towards the end of the winter.

Oysters that are in good condition and healthy are seldom directly killed by cold temperatures. Even when exposed to air and frozen they do not die unless jarred before they thaw. Certain microorganisms are present in oysters that cause them no apparent harm while the oysters are vigorous but these microorganisms increase in numbers when oysters become weakened or undergo unusual stress and may then become one of the factors leading to the oyster's death. Thus the losses last winter probably resulted from the combined stress of many factors, both physical and biological rather than the result of attack by a single specific organism.

During the spring of 1963 oysters have fattened rapidly. We have no reports of recent mortalities and oysters appear to have entered the spawning season this year in excellent condition in most Maryland areas.

Setting in 1963: The water this spring was cooler than normal so that temperatures at which oyster spawning occurs were not reached until about the end of May in most Maryland areas. A cool June then has delayed the sustained high-water temperatures that are needed for vigorous spawning and, since the larvae swim for about two weeks before setting, the start of setting can be expected to be later than usual this year.

Bags of test shells in most areas were first put over about the middle of June. These consist of small chicken wire bags each containing 25 clean oyster shells. They are removed and replaced by fresh ones weekly. The locations covered have been expanded through the use of additional help supplied by the Department of Tidewater Fisheries. In general, seed areas or potential seed areas are the primary ones being studied.

The first groups of exposed shells were taken up in mid-June 1963 at a few stations and full-scale sampling was under way by the last week in June. Among 12 stations from which shells were examined, only a single spat has been found. This was from the upper part of the Little Choptank and appeared to have set about the middle of the week of June 16-22. Counts for most areas, however, had not yet been made. As additional data accumulate they will be reported periodically together with other information of interest.

For more detailed data and a copy of the July 26, 1961 bulletin on causes of oyster mortality in Maryland, write to: Chesapeake Biological Laboratory, Natural Resources Institute, University of Maryland, Solomons, Md.

Pesticides

INTERIOR DEPARTMENT FAVORS RE-SEARCH TO DEVELOP NEW COMPOUNDS:

Proposed Federal legislation designed to promote the discovery and development of effective new pesticides which would be free of the hazards accompanying the use of many formulations now available has the support of the U. S. Department of the Interior. In reports submitted at the request of the United States Congress, the Department emphasized the need for expanded research in pesticides and evaluation of such materials.

The Department cited the report of the President's Science Advisory Committee on the "Use of Pesticides," which points out the necessity to discover the effect pesticides have "on the food chain of which every animal is part, and to determine possible pathways through which accumulated, and in some cases, magnified pesticide residues can find their way directly or indirectly to wildlife and to man." The Department stressed the desirability of acquainting the public with information acquired through pesticide research.

The pending legislation would be extremely helpful in extending urgently needed authorities and in providing more definitive guidelines in carrying out the Government's pesticide research program.

The legislation, according to the Department, "is not intended to be an enforcement measure or a means of regulating industry; rather it is designed to disseminate information to the general public and to promote more adequate and efficient research programs for the benefit of every one.

"Up to the present time," the Department added, "it has been the practice of the chemical industry to test new compounds upon relatively few forms of plant and animal life. These studies have not included tests upon indicator species of wild fishes, birds, mammals and food organisms to ascertain whether the compound poses hazards to such creatures in treated areas.

"The rapid expansion in the use of chemicals in all aspects for present-day living demand the closest cooperation and understanding among the various interested governmental agencies and the chemical industry. Chemicals essential to the health and comfort of the people, the maintenance of a safe

and adequate food supply, and the preservation of our natural resources, must be used intelligently and with full consideration of the possible adverse effects upon humans, domestic animals, and the Nation's fish and wildlife resources."

To achieve this, the Department said, "there must be continuous communication of plans and ideas between the scientists who point the way and the administrators who interpret new knowledge and place such knowledge in everyday use.

"This Department has long recognized that many situations involving losses to fish and wildlife following the application of insecticides, fungicides, rodenticides, and other pesticides are due to a lack of knowledge concerning ecological relationships and lack of information on the toxic effects of such formulation upon birds, fishes and mammals, and food organisms in areas where the pesticides are used. Because of their high toxicity, lack of specificity, stable residual properties, and biological magnification resulting from their tendency to accumulate in food organisms, a number of pesticidal chemicals now used pose unavoidable hazards. These can best be avoided by the discovery, development, and substitution of new materials which are highly specific in their effects and readily broken down in nature."

The proposed Federal legislation authorizes the construction and operation of necessary facilities, pesticide evaluation programs, and the wide distribution of information discovered as the result of the research programs.



Salmon

COLUMBIA RIVER CHINOOK MARKING PROJECT:

In the Columbia River area on the Pacific Coast, an effort is being made to measure the contribution to sport and commercial fisheries of hatchery-reared fall chinook salmon from 13 installations operated by the States of Oregon and Washington and the U. S. Fish and Wildlife Service. Under the Federally-financed program, nearly 2 million chinook fingerlings were marked and released from Oregon hatcheries in 1963.

The young fish were fin-clipped in a particular manner to assure their identification either when they return to spawn or are recovered in the offshore and Columbia River fisheries. Most of the survivors will return to spawn in the fall of 1965 as three-year-olds or in 1966 as four-year fish.

The 1963 fin-clipping project marks the second year of a proposed four-year evaluation program. (Fish Commission of Oregon, July 2, 1963.)



Shad

EFFORT TO REESTABLISH IN SUSQUEHANNA RIVER:

Eggs from West Coast shad in the Columbia River are being airlifted to Pennsylvania's Susquehanna River. It is expected that some 10 million eggs can be transferred to the upper Susquehanna from the apparently large Columbia River shad run in 1963. Shad presently occur in the Susquehanna, but four power dams, the first built in 1910, prevent their migration to upstream spawning grounds. This year's replanting efforts are an experiment to determine if water quality is such that shad can now survive in the upper Susquehanna. Results of the study may lead to the construction of fish passage facilities over the dams and eventual reestablishment of major shad runs.

Unseasonably cold water in eastern rivers prevented development of mature roe in Atlantic populations that might otherwise have provided eggs for the project. It is believed that shad of the Columbia River, having adapted to long up-river migrations, will move far up the Susquehanna to use spawning areas not now supporting the species.

Transplanting the shad has been aided by advanced techniques of fertilization, the use of oxygen-filled plastic shipping containers, styrofoam insulated packaging, and fast air transportation. The eggs arrive in their new Susquehanna home within 24 hours after leaving the Columbia River. The present airlift completes a historical round trip for a fish whose origin is the rivers of the Atlantic Coast. The shad was introduced into the Sacramento River from the East in 1871. It soon became well established and is now an important commercial and sport species on

the Columbia and elsewhere along the Pacific Coast.

Technicians from the Oregon Fish Commission, the Washington Department of Fisheries, and the U. S. Fish and Wildlife Service are aiding the Assistant Director of the Pennsylvania Fish Commission in taking the eggs from the Washougal reef area in the Columbia River above Portland, Oreg., for the conservation effort. The program, administered by the Federal Agency in conjunction with the States of Maryland, Pennsylvania, and New York, is being financed by eastern power companies.



Shrimp

ARTIFICIAL CULTIVATION OF PINK SHRIMP FROM EGG TO ADULT:

A graduate student at the Institute of Marine Science, University of Miami, has succeeded in rearing pink shrimp in a laboratory from the egg through all intermediate stages to adult shrimp--something science has never before accomplished with that species. A related Asian species of shrimp has been successfully reared in Japan, but previous attempts to rear the valuable commercial pink shrimp (*Penaeus duorarum*) of Atlantic and Gulf of Mexico waters have failed. Refinement of the new pink shrimp-rearing techniques eventually may result in commercial shrimp culture on a large scale.

Experimenters had previously learned that shrimp in the larval stage could be raised to maturity in protected tidal locations. (That method involved opening gates and allowing tidal waters to bring young shrimp into screened enclosures, where they were kept until they reached market size.) But culture in tidal waters was drastically limited by the presence of larval forms of predatory species which eat shrimp larvae. Eliminating unwanted forms while keeping the shrimp has been a great problem--particularly since investigators have not always been sure which of the microscopic larvae represented various stages of shrimp and which represented predators. By laboratory rearing of shrimp through the early stages, the problem might be eliminated in future shrimp "farming."

The successful experiment in shrimp rearing was aided greatly by earlier work

done by another Institute of Marine Science investigator who, in 1959 and 1960, succeeded in hatching shrimp eggs and keeping them alive through their first six stages of larval development. The tiny shrimp died at that point, apparently due to lack of suitable food. The later stages of shrimp development had also been previously studied by observing specimens obtained from plankton nets.

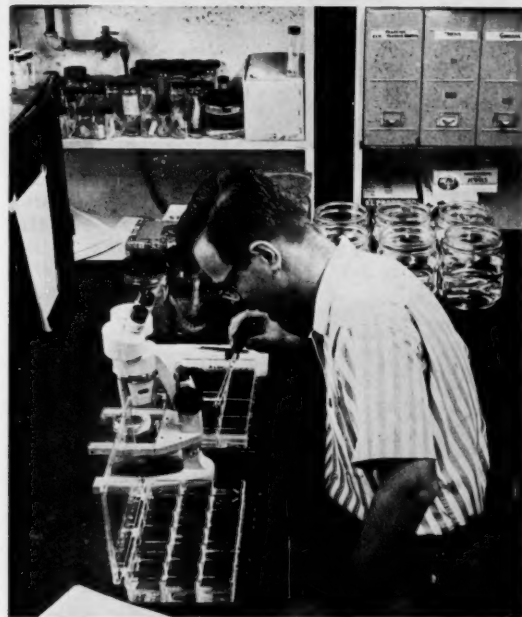


Fig. 1 - Larval pink shrimp were reared in compartmented trays. Shrimp were transferred daily to containers holding clean water.

Now as a result of the new breakthrough in shrimp culture confirming and furthering previous work, scientists know all the stages that pink shrimp go through and can identify them. Lack of such knowledge has hampered investigators in their research on the life histories, migrations, and distribution of shrimp. In taking plankton samples, scientists were confronted by thousands of different minute larval forms of marine animals. More than a hundred different larval stages of shrimp alone are found in the Dry Tortugas area of the Gulf of Mexico, where extensive shrimp beds are located. Identification was difficult since researchers had previously been unable to observe a pink shrimp go through its many stages before maturity.

In earlier attempts to rear shrimp, researchers had three major problems: (1) ob-

taining fertile eggs in good condition, (2) feeding the larval forms, and (3) keeping the tiny animals from becoming entangled in food or wastes while in laboratory containers.

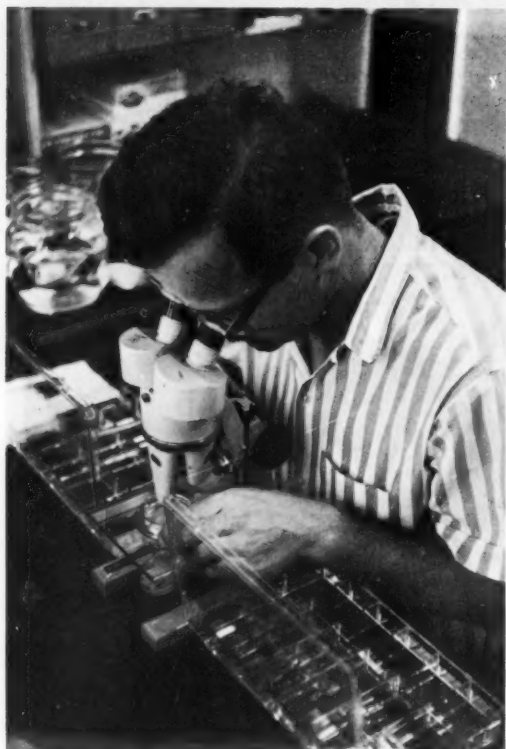


Fig. 2 - Shrimp biologist examines larval stage of pink shrimp through a binocular microscope.

The present successful experiment was started by taking spawning females in try-net hauls off Key West, Fla. The shrimp were then transported overland to Miami in 50-gallon plastic cans. At the Institute of Marine Science, the ripe female shrimp were put individually in 15-gallon aquarium tanks. Several of the shrimp spawned within a few days, and the eggs settled on the bottom of the tanks like a fine white powder.

Eggs were siphoned from the large tanks and placed in finger bowls containing filtered sea water. Many of the eggs hatched in a few hours, and specimens which survived the first critical stages of development were transferred to separate compartments of plastic trays where they could be studied individually through microscopes.



Fig. 3 - An adult shrimp from which hatching eggs were obtained and reared to maturity.

In the initial experiment, about 1,200 larval shrimp were divided into two groups; the first group was placed in Biscayne Bay water while the second group was kept in Gulf Stream water. Although the salinity and other measurable factors were the same for both environments, all shrimp in the Bay water died within a week, while 50 of those kept in Gulf Stream water survived to post-larval stages, and 10 survived to maturity. (Many of the deaths resulted from experiments with temperature, food, and other laboratory-imposed variables, and some specimens in each stage were killed and preserved for detailed study.) The larval shrimp were observed constantly and all were transferred daily to trays containing clean, unused water. They were fed a mixed culture of diatoms, a marine yeast, and three kinds of 1-celled algae. (*News of Institute of Marine Science*, June 11, 1963.)

Note: See *Commercial Fisheries Review*, January 1963 p. 49; May 1960 p. 53.

* * * * *

UNITED STATES SHRIMP SUPPLY INDICATORS, JUNE 1963:

Item and Period	1963	1962	1961	1960	1959
..... (1,000 Lbs., Heads-Off)					
Total landings, So. Atl. and Gulf States:					
August	-	12,332	10,944	20,441	18,595
July	-	12,283	10,500	21,746	17,493

(Table continued on next page)

Item and Period	1963	1962	1961	1960	1959
..... (1,000 Lbs., Heads-Off)					
June	13,800	11,316	8,233	12,427	14,547
May	10,254	6,151	5,276	6,335	6,885
January-April	15,816	14,619	17,521	18,013	14,082
January-December	-	105,779	91,396	141,035	130,660
Quantity canned, Gulf States 1/:					
August	-	1,333	1,090	4,427	2,228
July	-	3,551	2,793	5,802	2,633
June	4,770	4,913	3,438	6,920	7,061
May	3,630	1,794	1,208	1,461	2,461
January-April	900	831	317	653	566
January-December	-	23,210	14,500	26,394	22,659
Frozen inventories (as of end of each mo.) 2/:					
August 31	-	12,754	12,728	20,171	23,780
July 31	-	13,677	14,849	17,397	22,352
June 30	3/	13,796	19,416	15,338	19,283
May 31 4/	25,114	13,904	24,696	17,540	21,137
April 30 4/	24,954	15,637	27,492	20,502	23,331
March 31 4/	27,970	16,607	31,345	23,232	24,893
February 28 4/	28,039	19,012	37,612	29,063	27,555
Imports 5/:					
August	-	7,381	6,743	6,406	5,107
July	-	8,265	6,635	7,319	7,861
June	3/	9,397	8,065	8,932	8,800
May	11,110	11,221	8,278	9,902	8,264
January-April	49,937	43,383	40,825	32,531	33,262
January-December	-	141,384	126,268	113,418	106,555
... (¢/lb., 26-30 Count, Heads-Off) ...					
Ex-vessel price, all species, So. Atl. & Gulf Ports:					
September	-	90.9	70.1	52.2	46.4
August	-	83.6	66.1	52.0	46.9
July	-	82.1	55.8	54.6	49.2
June	6/ 72-83	84.4	53.7	64.1	60.7
May	6/ 80-86	83.7	52.8	62.9	63.3
April	6/ 82-90	82.2	55.4	60.6	65.2
March	6/ 85-82	80.9	56.0	56.3	67.6
February	6/ 84-93	76.9	53.5	51.8	69.6
Wholesale price froz. brown (5-lb. pkg.), Chicago, Ill.:					
September	-	113-118	87-90	65-70	62-64
August	-	110-112	76-91	64-67	62-64
July	-	3/	70-75	72-77	62-74
June	95-102	102-104	67-72	76-77	73-74
May	98-103	96-103	67-69	74-77	70-76
April	100-105	94-97	69-70	74-75	75-82
March	102-106	94-95	69-71	65-68	81-83
February	102-106	93-95	69-71	65-67	82-87

1/ Heads of headless shrimp determined by multiplying the number of standard cases by 30.3. The figures in the section (Quantity canned, Gulf States) have been completely revised beginning with February 1963 on the basis of a new conversion factor (formerly 33.0 pounds per case).

2/ Raw headless only; excludes breaded, peeled and deveined, etc.

3/ Not available.

4/ Inventory of Feb. 28, 1963, includes 957,000 pounds; Mar. 31, 1963, includes 1,536,000 pounds; Apr. 30, 1963, includes 545,000 pounds; and May 31, 1963, includes 544,000 pounds for firms not reporting previously.

5/ Includes fresh, frozen, canned, dried, and other shrimp products as reported by the Bureau of the Census.

6/ Range in prices at Tampa, Fla.; Morgan City, La.; area; Port Isabel and Brownsville, Texas, only.

Note: Data for 1963 and 1962 are preliminary. June 1963 data estimated from information published daily by the New Orleans Fishery Market News Service. To convert shrimp to heads-on weight multiply by 1.68.



South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, APRIL-JUNE 1963:

The following is a report on the progress of biological research by the Bears Bluff Laboratories, Wadmalaw Island, S. C., for April-June 1963:

Oyster Studies: During April-June 1963, oyster work has largely been confined to mapping of intertidal beds in the vicinity of Hilton Head. This was done in conjunction with the State's Division of Commercial Fisheries. At the request of that Division, State seed oyster beds were studied. The beds are located along the southern face of St. Helena Island. Detailed studies on the size of oysters and the density of population were made in that area in order to determine the number of bushels of seed oysters which could be removed without depleting the beds.

In the upper reaches of the Toogoodoo River to the northwest of the Laboratory, a subtidal oyster bed was examined. Spat baskets placed on that bed indicated a light spat fall and the area was marked off for shell-culch planting. This experimental planting will be carried out for the Laboratory by a Yorges Island canning company.

Shrimp Studies: Brown shrimp postlarvae, which first showed up in quantity in experimental plankton tows during the middle of March, continued to enter inside waters through early May. The number of postlarvae was somewhat less than during 1962. This decrease in postlarval shrimp is now being reflected in the catch per-unit-of-effort of juvenile and adult brown shrimp in Bears Bluff Laboratories' shrimp survey trawling at regular stations in coastal waters.

The unusually heavy rainfall which occurred during the last two weeks in June (over 9 inches at Bears Bluff) apparently brought about a seaward migration of much of the brown shrimp population from the creeks and rivers of the marshland areas. Commercial catches offshore increased greatly during that period but was expected to be only short-lived.

A few large white "roe" shrimp began to appear in offshore catches in late April and early May of this year. Unusual numbers of brown spotted shrimp were observed during May, and those shrimp were even more numerous than white shrimp at many locations.

Postlarval white shrimp began to appear in plankton tows in late May and continued to enter inshore waters through June. These postlarvae were very scarce, but were expected to increase in quantity by early July. Some brown spotted shrimp postlarvae also were taken in experimental plankton tows,

and it seems that this species will be more plentiful this year than usual

Finfish Experimental Otter Trawling: Experimental otter trawling at regular stations situated throughout the coastal area was continued on schedule during the quarter. The catch per-unit-of-effort for croaker and blue crabs was slightly lower during April through June of this year as compared with that period of 1962, but the decrease was so small that it is probably of little significance. Spot, however, were approximately 2.5 times less abundant in experimental trawling during the quarter as compared with that of last year. Also, both brown and white shrimp were considerably less numerous during the quarter.

Pond Cultivation: The experimental shrimp ponds at Bears Bluff presumably are not heavily populated this season because of the scarcity of postlarval and juvenile brown shrimp. Thus, rather than drain the ponds for harvest as is usual during the latter part of June, the ponds will be unharvested until October. White shrimp, larval and juvenile, will be added in July and August.

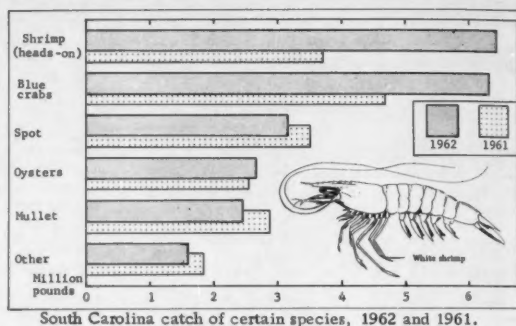
In April, the shrimp ponds were treated with rotenone to remove predaceous fishes. Further treatment will be given the ponds in August. To date supplemental food has not been added to any of the experimental ponds, but feeding with chopped fresh fish will begin in July.

A small-scale feeding experiment was carried out on two groups of juvenile brown shrimp. One group was fed with chopped fish, the other was unfed. Results indicated that supplemental feeding reduces the mortality of the captive shrimp by over 50 percent. This experiment also indicated that the growth rate of shrimp under crowded conditions is slow despite feeding.

FISHERY LANDINGS, 1962:

During 1962, landings of fish and shellfish at South Carolina ports totaled 22.7 million pounds--an increase of 18 percent as compared with 1961. Finfish landings decreased from 8 million pounds in 1961 to 7.1 million pounds in 1962, while shellfish landings increased from 11.2 to 15.5 million pounds. The greater part of the increase was due to the recovery in the catch of shrimp--one of

the mainstays in the economy of the State's fisheries. Increased catches of blue crabs also contributed to the greater volume of shellfish landed.



Food finfish landings in 1962 were about 11 percent less than in 1961, due primarily to poor beach-seine fishing in Horry County during the fall months. Mullet and spot were 3 to 4 weeks late in migrating along the shore and by the time the fish appeared, bad weather prevented fishing. Flounder landings in 1962 were up 40 percent compared with the preceding year; however, king whiting landings decreased 18 percent, spot 10 percent, and sea bass, 17 percent.

Shrimp landings in 1962 amounted to 6.5 million pounds (heads-on), a gain of 2.6 million pounds over 1961. Landings of brown shrimp in June, July, and August accounted for most of the gain. The average ex-vessel price for shrimp in 1962 was about 6 cents above that in 1961.

Blue crab landings in 1962 amounting to 6.3 million pounds were up 1.7 million pounds or 36 percent from 1961. The catch was the second highest recorded in the last 30 years. Most of the crabs taken by otter trawlers were shipped to Georgia, while the pot and trot line crabs were processed in South Carolina.

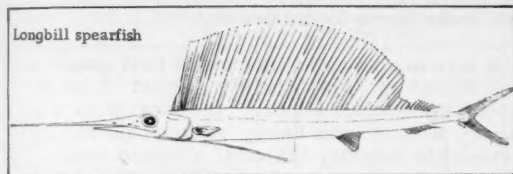
The oyster harvest of 2.7 million pounds in 1962 was up 5 percent from a year earlier. However, during the spring 1962 season, shucking plants experienced unsettled market conditions and low prices for the shucked product at a time the provisions of the new minimum wage law had to be met. These conditions caused many firms to close early in the spring season.



Spearfish

NEW SPECIES IDENTIFIED:

The presence in Atlantic and Gulf coastal waters of a new species of billfish or spearfish previously unknown to science has been established by biologists at the Institute of



Longbill spearfish

Marine Science, University of Miami. The fish was described by two scientists who have been conducting a worldwide study of marlins and other large marine fishes for several years. They have named the new species *Tetrapturus pfluegeri* in honor of the late Al Pflueger, Miami taxidermist and naturalist, who first recognized the presence of this fourth type of billfish in Florida waters.

The new fish, whose common name is the longbill spearfish, has been occasionally caught over the years by anglers and was often inaccurately identified as either a sailfish or a white marlin. The most obvious difference between the spearfish and other billfish is the size and shape of the dorsal fin, which in the spearfish is somewhat higher throughout most of its length than the dorsal fin of the white marlin, but not as high as the dorsal fin (or "sail") of the sailfish. Also, the dorsal fin of the spearfish is not spotted. Another difference is that the spearfish bill is shorter than the bill of either the sailfish or the white marlin.

Very little is known about the habits, distribution, or prevalence of the new species, although its identity is now known from Texas to Puerto Rico, and from Delaware to Venezuela. Definite catch records are available on only 36 spearfish most of which were taken from the Gulf Stream off southeast Florida. It is a small species, as billfishes go. The largest one on record (taken off Miami Beach in 1958) was about 6½ feet long and weighed about 68 pounds.

The two investigators from the Institute of Marine Science were the first scientists to associate the new billfish with the spearfish group. After a trip to the Mediterranean, they determined that the spearfish in western

Atlantic waters is not the same as the Mediterranean spearfish.

The success of the University of Miami billfish program--which has taken Institute of Marine Science specialists to Hawaii, New Zealand, Chile, Panama, Venezuela, the Mediterranean, and other areas--depends to a great extent on the support and cooperation of anglers. A scientist said that, "due to the help of sport fishermen, charter boat captains, taxidermists and others, we are learning much about pelagic fishes that might not otherwise have been learned for many years." (News of Institute of Marine Science, May 23, 1963.)



Tuna

BLUEFIN TUNA TAGGED OFF CAPE COD RECAPTURED NEAR MARYLAND COAST:

An early tag return from a bluefin tuna released by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel *Delaware* was reported in a purse-seine catch 20 miles off Ocean City, Md. The tuna was released 150 miles southeast of Cape Cod on June 8, along with 28 others of the same species, and traveled 325 miles to the west before its recapture by a commercial fishing vessel on June 27. Two plastic dart-type tags were recovered out of three tags placed in the fish. The fish weighed 92 pounds and measured 54 inches (fork length).

It has generally been believed that bluefin tuna off the edge of the Continental Shelf south of Cape Cod during the late spring of the year rapidly move into inshore areas to the north and east. These recently-tagged fish appear to have moved contrary to previous findings and suppositions.

* * * * *

BLUEFIN TUNA TAGGED OFF MEXICO RECAPTURED SOUTH OF JAPAN:

A bluefin tuna tagged near Guadalupe Island, Mexico, was recovered 5 years and 80 days later in the western Pacific Ocean off the south coast of Japan on April 23, 1963. After it was tagged the fish traveled more than 6,000 miles. This recovery holds the record for the longest period that a tagged tuna of any species has been free. The tuna weighed about 35 pounds when tagged and released in 1958 by a biologist of the Inter-

American Tropical Tuna Commission. It weighed in at 242 pounds (gutted and gilled) when recaptured.

Fishery scientists consider this recapture of great importance because it provides knowledge that bluefin tuna of the eastern and western Pacific apparently intermingle. The extent of intermingling, however, still remains to be determined.

Earlier recoveries of tagged fish have confirmed the Pacific migration of other species of the tuna family. A 2,370-mile migration of an albacore from Hawaii to Japan was recorded in March 1956. This followed the 1953 recapture near Tokyo of an albacore tagged off the California coast. Recoveries of bluefin tagged off the United States east coast and recovered in north European waters have demonstrated a trans-Atlantic migration for bluefin tuna.

The newly recovered bluefin was very large if compared to the average weight of 20 to 40 pounds for a Pacific bluefin. Atlantic bluefin, however, are usually considerably larger, weighing sometimes up to 1,500 pounds. The bluefin is the largest species of tuna and is also known as an important game fish, as well as a commercially valuable species. Generally, it seems to prefer more temperate waters than its related species, the yellowfin and skipjack tuna.

The extensive migrations of tunas have long been suspected by fishery biologists. The tagged fish provides the proof needed to trace their actual migrations. Many aspects of the biology of tunas are still unknown and much more remains to be learned about their habits and the sizes of the various tuna populations.

The Inter-American Tropical Tuna Commission is an international organization devoted to research on the eastern Pacific tuna and their conservation. It was established in 1949 by the United States, Costa Rica, Panama, and Ecuador.

INDUSTRY-GOVERNMENT MARKET PROMOTION:

The United States tuna-canning industry, with the aid of two Federal Government agencies, launched "Operation Tuna" during the summer months of 1963, a multi-million

dollar promotional campaign to improve the marketing of canned tuna. In a telegram to national food and allied trade associations, the U. S. Department of the Interior announced that it and the Department of Agriculture would actively cooperate with the tuna industry in this nationwide merchandising effort and urged that the trade associations also lend their force to the project.

It was announced that canned tuna would be featured in Agriculture's August "List of Foods in Plentiful Supply," the first time a fishery product was being featured in that Department's monthly bulletin. Canned tuna also was listed on the Food Stamp Plan for August. In addition, the Agriculture Department cooperated with the Interior Department in the distribution of promotional material through Agricultural marketing offices.

The U. S. Bureau of Commercial Fisheries developed the following promotional materials which are being used nationally: television slides and drop cards, and television and radio scripts adapted for public service announcements; two flyers; and food photographs for newspaper food editors.



U. S. Fishing Vessels

DOCUMENTATIONS ISSUED AND CANCELLED, MAY 1963:

During May 1963, a total of 85 vessels of 5 net tons and over were issued first documents as fishing craft, as compared with 47 in May 1962. There were 42 documents cancelled for fishing vessels in May 1963 as compared with 31 in May 1962.

Table 1 - U. S. Fishing Vessels 1/---Documentations Issued and Cancelled, by Areas, May 1963 with Comparisons

Area (Home Port)	May		Jan.-May		Total
	1963	1962	1963	1962	
..... (Number)					
<u>Issued first documents 2/:</u>					
New England	3	4	10	13	28
Middle Atlantic	3	1	7	2	3
Chesapeake	8	4	17	16	43
South Atlantic	9	3	27	13	47
Gulf	31	10	97	38	110
Pacific	30	25	77	62	130
Great Lakes	-	-	2	-	5
Puerto Rico	1	-	1	-	2
Total	85	47	238	144	368
<u>Removed from documentation 3/:</u>					
New England	5	3	24	11	24
Middle Atlantic	1	5	22	24	39
Chesapeake	4	1	10	6	23
South Atlantic	8	1	27	16	38
Gulf	13	12	55	46	104
Pacific	9	9	43	59	111

(Table continued on next page)

Area (Home Port)	May		Jan.-May		Total
	1963	1962	1963	1962	
	(Number)				
Great Lakes	2	-	7	8	22
Hawaii	-	-	1	3	3
Puerto Rico	-	-	-	-	1
Total	42	31	189	173	365

Footnote: Evaluation of footnotes, see table 2.

1/For explanation of footnotes, see table 2.

Table 2 - U. S. Fishing Vessels--Documents Issued and Cancelled, by Tonnage Groups, May 1963

Gross Tonnage	Issued 2/	Cancelled 3/
	(Number)	
5-9	14	18
10-19	36	12
20-29	10	4
30-39	2	3
40-49	5	-
50-59	-	2
60-69	5	2
70-79	10	-
290-299	1	-
310-319	1	-
430-439	-	1
790-799	1	-
Total	85	42

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.

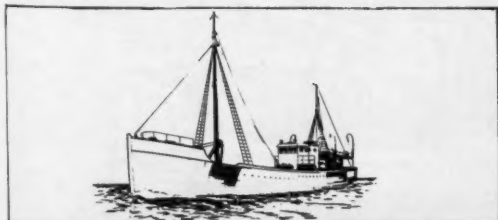
2/Includes 2 redocumented vessels in May 1963, previously removed from records. Vessels issued first documents as fishing craft were built: 55 in 1963; 6 in 1962; 4 in 1961; 2 in 1960; 1 in 1959; 1 in 1958; 1 in 1955; 1 in 1951; 13 prior to 1951; and 1 unknown.

3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc. Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

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FISHERIES LOAN FUND LOANS AND OTHER FINANCIAL AID FOR VESSELS, APRIL 1-JUNE 30, 1963:

From the beginning of the program in 1956 through June 30, 1963, a total of 1,268 applications for \$34,599,601 have been received by the U. S. Bureau of Commercial Fisheries, the agency administering the Federal Fisheries Loan Fund. Of those received, 673 (\$15,472,951) have been approved, 470 (\$12,087,624) have been declined or found ineligible, 147 (\$5,957,099) have been withdrawn by applicants before being processed, and 8 (\$303,544) are pending. Of the applications approved, 267 were approved for amounts less than applied for, aggregating \$1,648,027.



Type of otter trawler used in offshore ocean perch fishery. This is one type of fishing vessel on which Fisheries Loan Fund loans are granted.

The following loans were approved from April 1, 1963, through June 30, 1963:

New England Area: All in Maine--Maynard A. Townsend, Boothbay, \$6,100; Cleveland R. Barter, Jr., East Boothbay, \$5,500; John Field, Monhegan Island, \$2,000; Ronald F. Snow, Topsham, \$5,500; Sigward W. Beckman, Vinalhaven, \$3,500.

California: Donald and Walter Ghera, Eureka, \$7,500; Russell A. Wilson, Eureka, \$24,000.

Pacific Northwest Area: Edwin N. Goodrich, Astoria, Oreg., \$22,000; Jerome S. Werschkul, Warrenton, Oreg., \$16,907; Ludvig Furseth and Darold M. Mathisen, Seattle, Wash., \$22,000; Gunnar M. Ildhuso, Seattle, Wash., \$20,000.

Alaska: Aaron W. Bauder, Anchorage, \$6,500; Roy W. Allen, Haines, \$790; John B. Child, Homer, \$14,000; Edmond Allain, Ketchikan, \$3,000.

Hawaii: William Y. Hoy, Waianae, Oahu, \$8,000.

Under the Fishing Vessel Mortgage Insurance Program (also administered by the Bureau) during the second quarter of 1963, 6 applications to insure mortgages for \$1,181,665 were received and commitments to insure mortgages in the amount of \$248,004 on 6 fishing vessels were approved. Since the start of this program (June 5, 1960), 28 applications were received for \$3,486,640. Of the total, 21 applications have been approved for \$2,128,975. Seven applications for \$1,357,665 are pending. Since the Mortgage Insurance Program began, applications received and approved by area are:

New England Area: Received 10 (\$1,025,365), approved 8 (\$775,365).

California: Received and approved 1 (\$557,000).

South Atlantic and Gulf Area: Received 12 (\$436,729), approved 8 (\$289,064).

Pacific Northwest Area: Received 5 (\$1,467,546), approved 4 (\$507,546).

In the Construction Differential Subsidy Program, 5 applications for \$505,000 were received during the second quarter of 1963.

The first approval in this program was made in March 1961. The amount approved for subsidy represents about one-third the cost of a new vessel. Since the beginning of the program on June 12, 1960, 13 applications (excludes several ineligible applications) were received for \$1,101,770, of which 6 applications were approved for \$546,103. Seven applications for \$555,667 under this program are pending.

* * * * *

**"DAVID STARR JORDAN" WILL BE
NEW RESEARCH VESSEL FOR
PACIFIC INVESTIGATIONS:**

A \$1,747,876 contract to build the David Starr Jordan as a research vessel for the U. S. Bureau of Commercial Fisheries has been awarded to a firm in Sturgeon Bay, Wis. The vessel is to be delivered by October 1964. It will be based at San Diego, Calif., and used for tuna research and other fishery and oceanographic investigations in the Pacific Ocean.

Named after the prominent ichthyologist and first president of Stanford University, the David Starr Jordan will replace the Black Douglas which is over 30 years old.

The new vessel will be of welded steel construction with ranked stem and transom stern. It will have 2 partial decks below and 3 superstructure decks above the maindeck.

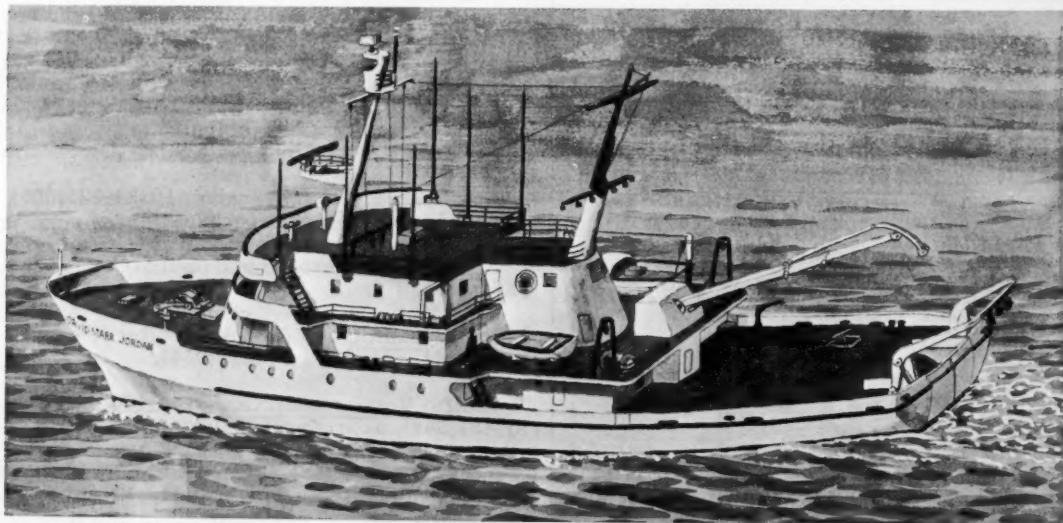
Specifications are: over-all length 171 feet, beam 32 feet, and draft 11 feet. Twin Diesel engines of 450 horsepower, each with controllable pitch propellers, will drive the vessel at 12 knots. It will be able to remain at sea more than 40 days and have a cruising range of more than 9,000 miles.

The new vessel will be outfitted with radar and modern navigational and oceanographic equipment. It will be equipped with biological, hydrographic, and chemical laboratories, as well as a lead-lined storage area for radioactive material. More than a third of the vessel's enclosed area will be devoted to laboratories and scientific supporting equipment which will include a data-processing center. Another feature is a large enclosed room which will house a combination seine-trawl winch and a deep-dredge winch. There will be living and working space for 22 crew members and 13 scientists. The David Starr Jordan will also have underwater observation stations similar to those on the recently completed Albatross IV.

* * * * *

**SHRIMP FISHING VESSELS AVERAGED
CLOSE TO 52 FEET IN LENGTH IN 1961:**

United States vessels in the 1961 South Atlantic and Gulf shrimp fishing fleet of about 3,512 vessels ranged from 24 to 125 feet in length. The over-all average shrimp vessel was 49.5 feet. The average length for shrimp



Artist's conception of David Starr Jordan.



Fig. 1 - Shrimp vessels docked at Thunderbolt, Ga.

vessels in the South Atlantic area was 43.8 feet, while in the Gulf the average was 51.9 feet. In 1961, there were 244 shrimp fishing vessels that fished both the South Atlantic and Gulf waters. These craft range from 32 to 71 feet in length, with the high point of the frequency occurring in the 51-foot class.

During 1961, there were in the South Atlantic and Gulf fleet, 50 vessels of less than 30 feet, 640 ranging in length from 30 to 39



Fig. 2 - Typical shrimp trawlers docked at Tampa, Fla.

feet, 1,000 vessels of 40-49 feet, 1,169 vessels 50-59 feet long (the high point of the frequency), 611 vessels of 60-69 feet, and 35 vessels of 70-99 feet. Only 7 vessels were 100 feet and over in length, with the longest measuring 125 feet.

CONVERTED YACHT NOW OLDEST FISHING VESSEL IN UNITED STATES:

The oldest fishing vessel still active in the United States fisheries is the Virginia

which was built as a luxury two-masted schooner yacht in 1865 at an Alabama shipyard. Now, 98 years later, the Virginia is still active in the Gulf of Mexico. Her present owner predicts that a century hence the Virginia will still be seaworthy and active.

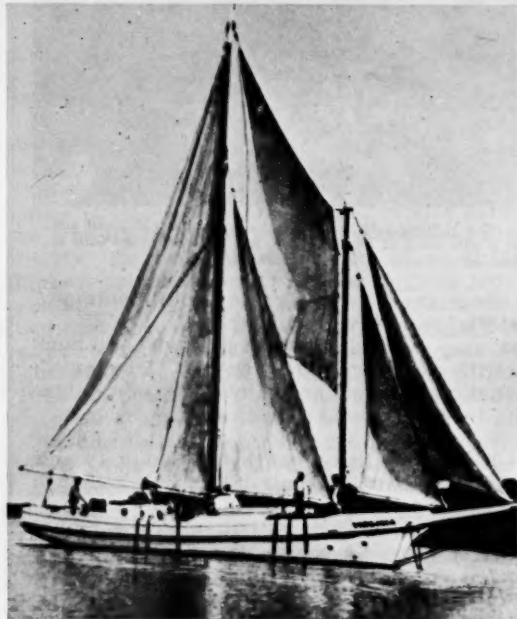


Fig. 1 - Virginia, a two-masted schooner (launched in 1865 on Fish River, Ala.) as it looked 25 years ago. The craft, with masts gone and otherwise changed, is now the oldest commercial fishing vessel in the United States commercial fishing fleet.

Attention has been focused on the Virginia as the result of a study by the U. S. Bureau of Commercial Fisheries to determine the age of the Nation's fishing fleet. The recently released compilation listed the Alabama-built schooner as the most venerable.

The Virginia began her commercial fishing career comparatively recently--in 1946--after a 5-year turn as a charter boat for sport fishermen. Her long history before that was not part of the fleet-age study.

The vessel now is based at Tampa, Fla., and her present owner purchased the craft in 1956. Those who have seen the boat in action in and out of Florida ports assert she is "strong as the Rock of Gibraltar." Her keel and ribs are black walnut and the planking is black cypress, two inches thick.



Fig. 2 - *Virginia* was converted to a power craft 25 years ago. It is now based at Tampa, Fla., and operates in the Gulf of Mexico and nearby Atlantic Ocean.

For nearly three-quarters of a century the *Virginia* traveled under sail. But 25 years ago the masts were removed and bunk facilities for 11 were taken out. A super-structure of combined pilothouse and cabin was installed along with an engine.

The vessel has a gross tonnage of 14 and can carry 20,000 pounds of iced fish, although the usual cargo is about 5,000 pounds. She can stay at sea 30 days, but generally makes 20 fishing trips a year. Her occupants no longer are people on a pleasure trip, but a crew of 2 to 4 fishing for red snapper and grouper.

The *Virginia* is known as a hand-liner because the catches are made by lines on hand-operated reels. One electric reel has been installed and the owner intends to replace the other hand-operated reels in the near future. An automatic pilot, depth-recorder, and fish-finder are also part of her modern equipment.



U. S. Foreign Trade

IMPORTS OF CANNED TUNA UNDER QUOTA:

United States imports of tuna canned in brine during January 1-June 29, 1963, amounted to 22,414,914 pounds (about 1,067,400 std. cases), according to data compiled by the Bureau of Customs. This was 19.0 percent less than the 27,679,895 pounds (about 1,318,100 std. cases) imported during January 1-June 30, 1962.

United States imports of tuna canned in brine during January 1-June 1, 1963, amounted to 19,864,501 pounds (about 945,900 std. cases), according to data compiled by the Bureau of Customs. This was 11.0 percent less than the 22,325,162 pounds (about 1,063,100 std. cases) imported during January 1-June 2, 1962.

The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1963 at the 12½-percent rate of duty is limited to 63,130,642 pounds (or about 3,006,221 std. cases of 48 7-oz. cans). Any imports in excess of the quota are dutiable at 25 percent ad valorem.

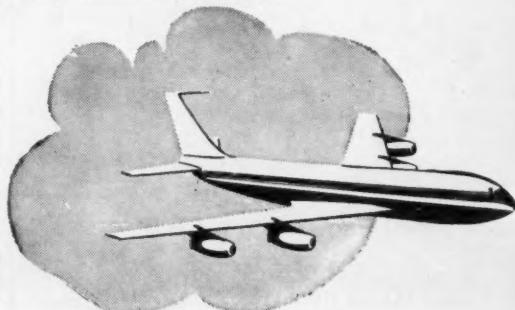
AIRBORNE IMPORTS OF FISHERY PRODUCTS, JANUARY-FEBRUARY 1963:

Airborne fishery imports into the United States in January 1963 amounted to 1,133,400 pounds valued at \$613,400, up 29.6 percent in quantity and 23.6 percent in value from those in the previous month. But in February 1963, shrimp shipments were cut back and airborne imports amounted to only 792,000 pounds valued at \$420,600.

Total airborne imports in January-February 1963 were up 53.6 percent in quantity and 90.9 percent in value from those in the same period of 1962. The increase was due mainly to larger shipments of shrimp and spiny lobsters.

Raw headless shrimp continued to make up the bulk of the airborne shrimp imports--in January 1963, shipments consisted of 833,462 pounds of fresh or frozen raw headless, 114,343 pounds of frozen peeled and deveined, and 10,927 pounds of unclassified shrimp; in February 1963, shipments consisted of 613,349 pounds of fresh or frozen raw headless, 11,842 pounds of frozen peeled and deveined, and 17,366 pounds of unclassified shrimp. Approximately 90 percent of the total airborne shrimp imports in January and February 1963 entered through the U. S. Customs District of Florida. The remainder entered through the Customs Districts of New Orleans (La.), Galveston (Tex.), and San Francisco (Calif.).

Airborne imports of shellfish other than shrimp in January 1963 included 109,709 pounds of spiny lobster tails and 24,205 pounds of unclassified spiny lobster products. In February 1963, airborne spiny lobster arrivals consisted of 81,027 pounds of lobster tails and 4,218 pounds of unclassified spiny lobster products. The spiny lobster airborne imports originated in Central and South American countries and entered through the Customs Districts of Florida, Galveston (Tex.), and Puerto Rico.



U. S. 1/Airborne Imports of Fishery Products, January-February 1963, with Comparative Data				
Product and Origin 2/	Jan.-Feb. 1963		Jan.-Feb. 1962	
	Qty. 3/	Value 4/	Qty. 3/	Value 4/
	1,000 Lbs.	US\$ 1,000	1,000 Lbs.	US\$ 1,000
Fish:				
Mexico	39.9	13.0	76.7	10.0
Honduras	8.5	2.0	-	-
British Honduras	19.9	4.7	-	-
United Kingdom	0.7	1.5	-	-
Ireland	0.8	0.3	-	-
France	0.4	0.3	0.1	0.1
Canada	-	-	1.0	0.4
Total fish	70.2	21.8	77.8	10.5
Shrimp:				
Guatemala	62.3	32.3	49.5	24.0
El Salvador	107.5	74.1	67.1	42.2
Nicaragua	9.5	3.5	329.9	107.1
Costa Rica	210.4	101.2	22.6	9.0
Panama	405.4	217.5	135.6	70.5
Venezuela	806.2	392.8	462.8	194.7
Ecuador	-	-	12.2	3.4
Mexico	-	-	6.1	3.8
Total shrimp	1,601.3	821.4	1,085.8	454.7
Shellfish other than shrimp:				
Mexico	48.1	28.2	5.0	2.9
British Honduras	67.3	54.4	39.9	26.1
Honduras	0.4	0.3	28.4	24.9
Nicaragua	26.9	23.2	-	-
Costa Rica	62.1	53.6	1.0	0.9
Jamaica	11.5	8.7	14.9	10.9
Dominican Republic	6.2	5.0	-	-
Netherlands Antilles	16.6	9.9	1.8	0.7
Venezuela	13.7	6.0	11.6	6.0
Ecuador	1.1	1.5	-	-
Panama	-	-	0.5	0.6
Guatemala	-	-	2.4	1.9
Leeward and Windward Islands	-	-	1.7	0.6
Japan	-	-	0.1	0.3
France	-	-	0.1	0.2
Total shellfish (exclud- ing shrimp)	253.9	190.8	107.4	76.0
Grand total	1,925.4	1,034.0	1,271.0	541.6

1/Imports into Puerto Rico from foreign countries are considered to be United States imports and are included. But United States trade with Puerto Rico and with United States possessions and trade between United States possessions are not included.
 2/When the country of origin is not known, the country of shipment is shown.
 3/Gross weight of shipments, including the weight of containers, wrappings, crates, and moisture content.
 4/F.o.b. point of shipment. Does not include U. S. import duties, air freight, or insurance.
 Note: These data are included in the over-all import figures for total imports, i.e., these imports are not to be added to other import data published.
 Source: United States Airborne General Imports of Merchandise, FT 380, January-February 1963, U. S. Bureau of the Census.

The leading finfish product imported by air in the first two months of 1963 was fish filets (mostly from Mexico, Honduras, and British Honduras).

The data as issued do not show the state of all products--fresh, frozen, or canned--but it is believed that the bulk of the airborne imports consists of fresh and frozen products.

EDIBLE FISHERY PRODUCTS:

May 1963: Imports of fresh, frozen, and processed edible fish and shellfish into the United States in May 1963 were up 2.1 percent in quantity and 9.9 percent in value from

the previous month. In May, shipments of the higher-priced northern lobsters from Canada were much heavier, and imports were also up considerably for canned lobsters, fish blocks and slabs, frozen tuna other than albacore, canned sardines not in oil, and sea scallops. The gain was partly offset by a decline in imports of frozen albacore tuna, canned tuna, canned sardines in oil, ocean perch filets, swordfish filets, and canned oysters.

Compared with the same month in 1962, imports in May 1963 were down 19.1 percent in quantity, and 2.9 percent in value. There was a heavy cutback in imports of frozen tuna this May, as well as a sizable decline in imports of canned sardines in oil, canned salmon, cod filets, flounder filets, and swordfish filets. But imports were up for some of the higher-priced fishery products such as frozen spiny lobsters, canned oysters, and canned crab meat. In addition, a number of fishery products increased in price this year. Therefore, the value of the imports in May 1963 did not decline as much as the quantity.

In the first 5 months of 1963, imports were down 6.0 percent in quantity and 2.4 percent in value. Fluctuations in individual import items were much greater than the over-all totals indicate. Imports were down sharply in 1963 for frozen tuna, canned sardines in oil, and canned salmon. There was also a noticeable drop in arrivals of canned tuna, haddock filets, and flounder filets. On the other hand, there was a large increase in imports of canned sardines not in oil and frozen shrimp, as well as heavier shipments of ocean perch filets, canned crab meat, and frozen frog legs.

U. S. Imports and Exports of Edible Fishery Products, May 1963 with Comparisons								
Item	Quantity				Value			
	May		Jan.-May		May		Jan.-May	
	1963	1962	1963	1962	1963	1962	1963	1962
	.. (Millions of Lbs.) ..				.. (Millions of \$) ..			
Imports:								
Fish & Shellfish:								
Fresh, froz. & processed ^{1/} ..	88.1	108.9	447.3	475.6	33.2	34.2	155.4	159.3
Exports:								
Fish & Shellfish:								
Processed only ^{1/} (excluding fresh & frozen) ..	2.0	2.1	14.6	14.2	0.7	0.7	5.6	5.9
^{1/} Includes pastes, sauces, clam chowder and juice, and other specialties.								

1/Includes pastes, sauces, clam chowder and juice, and other specialties.

Exports of processed fish and shellfish from the United States in May 1963 were up 25.0 percent in quantity, but down 12.5 per-

cent in value from those in the previous month. Larger shipments of the lower-priced canned squid accounted for most of the increase in quantity, while smaller shipments of the higher-priced canned salmon reduced the value of the exports in May.

Compared with the same month in 1962, the exports in May 1963 were down 5.6 percent in quantity, although the value of the exports was the same in both months. A sharp drop in exports of canned sardines not in oil this May was almost offset by larger shipments of most other canned fish export items.

Processed fish and shellfish exports in the first 5 months of 1963 were up 2.8 percent in quantity, but down 5.9 percent in value from those in the same period in 1962. The drop in value was due to a general decline in the price of canned fishery products in 1963. The small gain in quantity was due mainly to heavier shipments of the lower-priced canned squid (mostly to Greece and the Philippines). There was also a moderate increase in exports of canned salmon and canned shrimp. But exports of canned sardines not in oil and canned mackerel were down. Although not covered in the table, exports of frozen shrimp were up sharply in the first 5 months of 1963 (increase mostly in exports to Japan).

April 1963: Imports of fresh, frozen, and processed edible fish and shellfish into the United States in April 1963 were down 9.8 percent in quantity and 9.3 percent in value from the previous month. The drop was due mainly to sharply lower imports of canned sardines not in oil and frozen albacore tuna, as well as a moderate decline in frozen shrimp arrivals.

Compared with the same month in 1962, imports in April 1963 were down 5.0 percent in quantity and 2.0 percent in value. There was a heavy cutback in imports of frozen tuna this April and also a large drop in imports of canned salmon and canned sardines in oil. But there was a sizable gain in imports of ocean perch fillets, sea catfish fillets, canned tuna in brine, and frozen shrimp.

In the first 4 months of 1963, imports were down 2.0 percent in quantity and 2.3 percent in value as compared with the same period in 1962. Although the over-all totals were about the same in both years, there was considerable fluctuation in individual import

items. There was a large increase in the 1963 imports of canned sardines not in oil, and imports of frozen shrimp were also considerably higher. On the other hand, imports were down for frozen tuna, canned tuna in brine, canned salmon, canned sardines in oil, frozen spiny lobsters and frozen haddock fillets.

Item	Quantity				Value			
	Apr.		Jan.-Apr.		Apr.		Jan.-Apr.	
	1963	1962	1963	1962	1963	1962	1963	1962
.. (Millions of Lbs.) .. (Millions of \$) ..								
Imports:								
Fish & Shellfish:								
Fresh, froz., & processed ¹ ..	86.3	90.8	359.2	366.7	30.2	30.8	122.2	125.1
Exports:								
Fish & Shellfish:								
Processed only ¹ (excluding fresh & frozen) ..	1.6	2.0	12.6	12.1	0.8	1.2	4.9	5.2
¹ /Includes pastes, sauces, clam chowder and juice, and other specialties.								

Exports of processed fish and shellfish from the United States in April 1963 were down 48.4 percent in quantity and 33.3 percent in value from those in the previous month. The cutback in shipments in April affected most canned fish export items with canned salmon and canned squid showing the largest decline.

Compared with the same month in 1962, exports in April 1963 were down 20.0 percent in quantity and 33.3 percent in value. Exports were down this April for the higher-priced canned salmon, while shipments of the lower-priced canned mackerel and canned squid showed a modest increase.

Processed fish and shellfish exports in the first 4 months of 1963 were up 4.1 percent in quantity, but down 5.8 percent in value from those in the same period in 1962. The drop in value was due to a general decline in the price of canned fishery products in 1963. The small gain in quantity was due mainly to heavier shipments of the lower-priced canned squid (mostly to Greece and the Philippines). There was also a moderate increase in exports of canned salmon, canned sardines not in oil, and canned shrimp. But exports of canned mackerel were down. Although not covered in the table, exports of frozen shrimp were up sharply in the first 4 months of 1963 (increase mostly in exports to Japan).



Vessel Unloading

FISH UNLOADING, DE-ICING, AND WEIGHING EQUIPMENT RETESTED AT BOSTON:

The mobile fish unloading, de-icing, and weighing equipment, developed by the Gloucester Technological Laboratory of the U. S. Bureau of Commercial Fisheries as part of a program to promote efficient and sanitary handling of fishery products, was retested at the Boston Fish Pier during the week of June 10, 1963.



Receiving hopper of one of the fish-handling units tested.

The unit operated successfully at the rate of 20,000 pounds of fish an hour, and was able to keep ahead of the lumpers working in the fish holds at all times.

Note: See *Commercial Fisheries Review*, August 1957 p. 9, for a diagram and description of the mobile fish-unloading equipment. Also, "Mechanically De-icing and Weighing Groundfish at the Dock in New England," reprint from *Fishery Industrial Research*, vol. 2 no. 1.



Whales

SCIENTISTS EXPLAIN WHY WHALES STRAND ON BEACHES:

Does a failure of whale "sonar" cause the mass strandings of whales that occur many times yearly in various parts of the world? A new theory of whale-strandings was developed by a Dutch zoologist, who accumulated records of 133 mass strandings throughout the world. Thousands of whales of 20 different species were involved. All strandings occurred on gently sloping beaches, broad shallow flats, or in shallow bays or estuaries. None took place on rocky coasts. Significantly, most strandings involved pilot

whales, sperm whales, or false-killer whales--all of which are species that generally stay offshore in deep water.



These pilot whales became stranded on the beach near Marineland, Fla. Science now believes that such mass strandings are caused by a failure of the whales' "sonar" systems in shallow water on gently sloping beaches.

Research has recently established that whales have highly sensitive echo-ranging organs. All species tested have been found to emit a wide range of sounds, including ultrasonic clicks that are apparently used in the same way that ships use the sonic "pings" of fish-finders and depth-sounders. Whales are believed to use their sonars to avoid collisions, to maintain orderly formations, to navigate, and to find prey. By gauging the time it takes a pulse to bounce back from an object, they judge distance and make extremely minute differentiations. Tests indicate that some species, when blindfolded or in total darkness, can swim through a maze of obstacles, and can even distinguish between two fishes of different species but of about the same size. There is evidence, too, that whales may use sound signals to communicate with one another over great distances. Whales have no vocal chords and all sounds are apparently created within the blowholes, or nostrils, which are located on top of their heads.

If whale sonar is far more efficient than science has been able to devise, why should whales lose their sense of direction and dash themselves ashore in what seems a senseless, suicidal gesture? Answers to this question have been sought for centuries.

Scientific tests have established that sounds made by whales travel upward and outward but never downward. In murky water then, where vision would be ineffective, whales would presumably have to roll over and "scan"

with their sonars to determine the depth. If engrossed in feeding or chasing prey along a sloping beach, they might find themselves in shallow water without warning.

The Dutch scientist made numerous sonar tests from a vessel in shallow water and found that sloping beaches tend to "mask," distort, or even entirely eliminate returns sent out in a horizontal direction from beneath the surface. The sound waves often glanced off the sloping bottom and kept going, so that the sonar apparatus indicated deep water ahead when the vessel was actually approaching the beach and about to go aground.

In the case of whales, the hazards are undoubtedly increased when the bodies of other whales, close-packed and milling about, further hamper the effective use of sonic signals. It is easy to imagine the difficulty of screening true echo "pings" from the urgent pulses being transmitted by the other animals in the herd. And if the water becomes so shallow that the whales' blowholes cannot be kept submerged, their sonic apparatus would be totally ineffective, and complete panic might follow.

Confirmation of this new theory may constitute a major "breakthrough" in the new field of marine bioacoustics--the study of sounds made by marine animals. The sounds of whales, fish, and other ocean life are currently under investigation at a unique audio-visual Observation Station which the Institute of Marine Science, University of Miami, has set up at Bimini, in the Bahamas. The United States Navy-sponsored installation, under the supervision of the head of the Institute's submarine acoustic group, consists of an underwater television set and three hydrophones (underwater "microphones") mounted on the bottom at a depth of 65 feet. The equipment is located near a dropoff on the eastern edge of the Gulf Stream. Mile-long cables connect the underwater apparatus to a video monitor, a kinescope recorder and sound-recording and analyzing equipment housed ashore. Another hydrophone is located two miles from shore at a depth of 1,200 feet. Scientists can sit in the control room at Bimini, listen to and record sounds made by marine animals, and even see the animals which make the sounds.

More than 30 different sounds have been heard from the Institute's monitor station, indicating that the ocean is far from being

a "silent world." (News release, International Oceanographic Foundation, Miami, Fla., May 15, 1963.)



Wholesale Prices

EDIBLE FISH AND SHELLFISH, JUNE 1963:

Wholesale price trends for fishery products were mostly downward this June, but tended upward for fish landed in New England. The June 1963 wholesale price index for edible fishery products (fresh, frozen, and canned) at 114.4 percent of the 1957-59 average was lower (down 1.3 percent) than for May. From May to June, prices dropped for salmon, shrimp, several canned fish items, and for fresh-water fish varieties. Compared with the same month in 1962, the wholesale price index this June was down 3.3 percent.

A drop in fresh and frozen salmon prices and sharply lower prices for Great Lakes fresh-water fish were directly responsible for a 4.9-percent decrease from May to June in the drawn, dressed, or whole finfish subgroup. Because of improved supplies at Chicago, Lake Superior whitefish prices this June were down 13.7 percent from the previous month, and prices for Great Lakes yellow pike at New York City were lower by 29.5 percent. At New York City prices for fresh and frozen dressed king salmon also were lower (dropped 6.8 percent) than in May, but fresh halibut prices remained steady from May to June. Frozen halibut stocks from the 1962 North Pacific catch were still plentiful in June and the gradually declining market for that product had some influence in bringing about much lower 1963 halibut ex-vessel and wholesale prices than a year earlier. Generally lower prices in the subgroup were offset by a substantial increase (up 13.6 percent) in ex-vessel prices for haddock at Boston because of lighter-than-normal haddock landings. Compared with June 1962, the subgroup index this June was down 4.0 percent because of lower prices for all items except fresh drawn haddock (up 64.5 percent from a year earlier).



Tallying barrels of fresh bagged scallops after unloading from vessel at the dock in the New York City Fulton Fish Market.

Higher prices than in May for fresh haddock fillets (up 5.1 percent) at Boston this June were related to the higher prices for ex-vessel haddock. Combined with higher prices for shucked oysters (up 3.0 percent) at Norfolk, the subgroup index for processed fresh fish and shellfish this June

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, June 1963 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices $\frac{1}{2}$ (\$)		Indexes (1957-59=100)			
			June 1963	May 1963	June 1963	May 1963	Apr. 1963	June 1962
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					114.4	115.9	113.6	118.3
Fresh & Frozen Fishery Products:					120.5	122.4	117.7	117.5
Drawn, Dressed, or Whole Finfish:					109.7	115.4	106.6	114.3
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.13	.11	97.9	86.2	62.5	59.5
Halibut, West., 20/80 lbs., drsl., fresh or froz.	New York	lb.	.36	.36	106.4	105.9	118.3	130.1
Salmon, king, lge. & med., drsl., fresh or froz.	New York	lb.	.85	.92	118.8	127.5	122.3	134.5
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.57	.74	84.3	110.4	104.5	103.0
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.47	.66	76.2	108.1	68.8	73.7
Processed, Fresh (Fish & Shellfish):					135.1	133.9	127.7	120.6
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.42	.40	100.8	95.9	76.5	76.5
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	1.14	1.15	133.0	134.8	128.9	121.9
Oysters, shucked, standards	Norfolk	gal.	8.50	8.25	143.3	139.1	134.9	126.5
Processed, Frozen (Fish & Shellfish):					113.1	114.0	114.4	112.7
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.39	100.1	96.9	97.6	96.3
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.35	.35	102.6	102.6	99.7	96.7
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.94	.94	117.5	117.5	117.5	106.1
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	1.00	1.02	118.6	120.4	122.8	122.2
Canned Fishery Products:					104.1	104.9	106.8	120.1
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	24.00	24.25	104.6	105.7	105.7	124.2
Tuna, lt. meat, chunk, No. 1 1/2 tuna (6-1 1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.25	11.25	99.9	99.9	104.4	107.9
Mackerel, jack, Calif., No. 1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	5.90	5.90	2/100.0	2/100.0	2/100.0	3/118.5
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.81	9.06	113.0	116.2	116.2	145.1

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

2/One commodity has been dropped in the fishery products index as of December 1962--"Sardines, Calif., tom. pack, No. 1 oval (15-oz.), 24 cans/cs."--and replaced by "Mackerel, jack, Calif., No. 1 tall (15-oz.), 48 cans/cs." Under revised procedures by the Bureau of Labor Statistics all new products enter wholesale price indexes at 100.

3/Based on Calif. sardines and not directly comparable with replacement (jack mackerel) for January-June 1963.

rose 0.9 percent from the previous month. Fresh shrimp prices at New York City in June dropped slightly (down 1 cent a pound) from May but were still 9.1 percent higher than in June 1962. The subgroup price index this June was up 12.0 percent as compared with June a year earlier due to considerably higher prices for all items.

The processed frozen fish and shellfish price index this June was down 0.8 percent from the previous month, but rose 0.4 percent from June 1962. A decline (down 2 cents a pound) in frozen shrimp prices at Chicago from May to June was offset by higher prices (up 1.2 percent) for frozen flounder fillets. Prices for frozen haddock and ocean perch fillets were unchanged from the previous month. As compared with the same month a year earlier, prices this June were higher for all items in the subgroup except frozen shrimp.

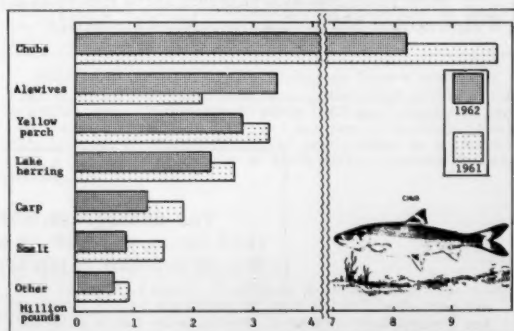
The canned fishery products subgroup price index from May to June dropped 0.8 percent because of lower prices for canned pink salmon (down 1.1 percent) and canned Maine sardines (down 2.8 percent). Prices for canned tuna this June were unchanged from those in May but were lower than June 1962 by 7.4 percent. There were indications of a pick-up in sales of canned tuna during June following the significant drop in demand of the previous two months. As compared with the same month a year earlier, prices this June were lower (down 13.3 percent) for all canned fish products.



Wisconsin

FISHERY LANDINGS, 1962:

Total landings of fish at Wisconsin ports of Lake Superior and Lake Michigan (including Green Bay) during 1962 amounted to 19.1 million pounds--2.9 million pounds or 13 percent below the previous year.



Landings of certain fish in Wisconsin, 1962 and 1961.

Landings in Wisconsin during 1962 from Lake Michigan accounted for 11.2 million pounds, Green Bay 4.4, and Lake Superior 3.5 million pounds.

Four species of fish comprised 86 percent of the 1962 catch. They were: chubs 42 percent; alewives 17; yellow perch 15; and lake herring 12 percent. Over one-half of the remainder consisted of carp and smelt.

Landings of chubs ranged from a monthly low of 420,000 pounds in February to a high of 708,000 pounds in August. Over one-half of the alewife catch was made during May, June, and July. Yellow perch was taken principally during June through November when the monthly catch varied from 285,000 to 392,000 pounds. Production of lake herring was confined almost exclusively to the months of November and December.



EMPLOYMENT OPPORTUNITIES FOR BIOLOGISTS WITH CALIFORNIA DEPARTMENT OF FISH AND GAME

The California State Personnel Board announced in July 1963 open nationwide examinations for qualified biologists interested in career employment with the California State Department of Fish and Game as follows:

<u>Classifications</u>	<u>Monthly Salary</u>
Fishery Biologist II	\$536-650
Marine Biologist II	536-650
Fishery Biologist III	619-753
Pollution Bioanalyst II	536-650
Pollution Bioanalyst III	619-753

The closing date for filing applications for those positions is September 6, 1963. Written examinations for applicants will be given on October 5, 1963.

Written examinations and subsequent personal interviews for applicants will be held in California and such other States as the number of candidates warrant and conditions permit. Personal interviews are planned for certain major cities throughout the United States. Admission to the examinations requires a college degree in biological sciences and varying amounts of either graduate work or experience in fishery research or management.

Applications and further information can be obtained by writing: State Personnel Board, 801 Capitol Mall, Sacramento 14, Calif.

CORRECTION

The photograph which appeared in the June 1963 issue, page 20, should have had the caption: Japanese stern ramp trawler Akebono Maru No. 51.



FOREIGN

International

CODEx ALIMENTARIUS COMMISSION

FIRST MEETING HELD ON THE DEVELOPMENT OF WORLDWIDE FOOD STANDARDS:

A four-man Canadian delegation of food experts attended a meeting held in Rome, June 25 to July 3 this year, to develop and simplify work on international food standards. This was the first session of the Codex Alimentarius Commission, which was established jointly by the Food and Agriculture Organization (FAO) and the World Health Organization (WHO).

The Codex Alimentarius Commission was established following a joint FAO/WHO Conference on Food Standards held in Geneva in October 1962. Representatives of 44 member nations of FAO attended, together with observers from 24 international organizations. The Conference fully endorsed the need for an international body to coordinate the development of food standards both on a worldwide and a regional basis. Stress was placed on the importance of this work to developed and developing countries alike.

It was agreed at the Geneva Conference that the new Commission develop two types of standards. The first would be a minimum "platform" standard, and any country accepting it would undertake to ensure that its own corresponding national standard would not be lower. The second, or "trading" standard, would be higher, and its adoption by a government would imply that all products affected must conform to it in order to be imported and sold within its jurisdiction.

At its first session, the new Commission considered priorities for food standards and allocation of priority work on their development to specialized agencies. (Department of Fisheries, Ottawa, June 18, 1963.)

FISH MEAL

WORLD PRODUCTION, APRIL 1963:

World production of fish meal in April 1963 was up 24.7 percent from that in the same month of 1962, according to preliminary data from the International Association of Fish Meal Manufacturers.

Most of the principal countries producing fish meal submit data to the Association monthly (see table).

World Fish Meal Production by Countries, April 1963				
Country	April		Jan.-Apr.	
	1963	1962	1963	1962
	..... (Metric Tons)			
Canada	1,311	2,338	26,924	33,432
Denmark	7,081	3,955	25,692	19,805
France	1,100	1,100	4,400	4,400
German Federal Republic	7,473	6,960	27,345	26,779
Netherlands	1/	500	1/	1,600
Spain	2,180	2,429	9,196	8,898
Sweden	822	482	2,029	1,870
United Kingdom	6,438	6,407	26,441	23,922
United States	7,887	2/5,725	14,962	2/12,340
Angola	1,333	1,891	8,886	10,343
Iceland	8,742	4,040	30,212	17,269
Norway	4,000	3,345	14,370	16,123
Peru	129,104	100,074	442,641	339,090
South Africa (including South-West Africa) ..	33,237	29,701	81,326	102,651
Total	210,708	168,947	714,424	618,522

1/ Data not available.

2/ Revised.

Note: Belgium, Chile, Japan, and Morocco do not report their fish meal production to the International Association of Fish Meal Manufacturers at present.

The increase in fish meal production in April 1963 was due mainly to greater output in Peru which accounted for 61.3 percent of world production during the month. In January-April 1963, Peru accounted for 62.0 percent of total fish meal production.

World fish meal production during the first 4 months of 1963 was 15.5 percent greater than in the same period of the previous year. Production in early 1963 was boosted by record landings of anchoveta in Peru and record landings of herring in Iceland. The increase was partly offset by a considerable decline in production in South Africa, Canada, Norway, and Angola.

FISH OIL

WORLD EXPORTS, 1962:

World gross exports of fish oils (including fish-liver oils) reached a record 455,000 short tons in 1962, reflecting the expansion of fish oil shipments from Peru and Iceland, and

International (Contd.):

to a lesser extent from Chile and Denmark. World exports increased by 88,000 tons from the previous high of 1961 and were twice the 1955-59 average.

Peru, the United States, Iceland, the South Africa Republic, Chile, and Portugal are the most important world suppliers of fish oil, accounting for over 95 percent of the world's net exports and over 80 percent of the world's gross exports of fish oil in 1962. Although several European countries export sizable quantities of fish oil, the area as a whole is the world's major market for fish oil. Much of the domestic production of fish oil in Europe is retained for consumption in the country of origin, or exported to other European countries. In addition, Norway, Western Germany, the Netherlands, and Denmark import large quantities of fish oil for further processing and export largely to other European countries.

Peruvian fish oil exports reached a record 164,000 tons in 1962, up 45 percent from the previous high of 1961. Iceland's exports more than doubled in 1962. The increase en-

abled Iceland to surpass the United States and rank second to Peru as the world's leading supplier of fish oil in 1962. Apart from Chile, shipments from the other major exporting countries declined slightly in 1962. Norway's reported exports of fish oil were down slightly in 1962, but were probably much larger than indicated due to the exclusion of hardened fish oils which are not classified separately in trade statistics.

FOOD AND AGRICULTURE ORGANIZATION

EXTENSIVE USE OF SYNTHETIC MATERIALS IN FISH NETTING:

The rapidly increasing use of knotless nets made of synthetic fibers was evident during the Second World Fishing Gear Congress, held in London, May 27-31, 1963, by the Food and Agriculture Organization (FAO).

The discussion on materials which took place during the first day of the Congress embraced standardization of both the numbering systems of twines and of net-testing methods; as well as a survey of new net materials and of new developments in lines and ropes, knotless nets, and monofilament nets.

A proposal for a standardized international numbering system for netting twines, applicable to both natural and artificial fibers, was presented to the Congress. This proposal--already adopted by ISO (The International Standards Organization)--is based upon a "tex" system which expresses the weight in grams of 1,000 meters of twine.

In the six years that have elapsed since the first World Fishing Gear Congress in Hamburg, many new types of synthetic materials have come into use for fishing gear, it was stated. Most countries now use synthetic materials for well over half their gear. In Japan this figure approaches 90 percent, while in the important Peruvian purse-seine fisheries nets are made of nylon only.

Many papers presented to the Congress discussed the relative values of different synthetic materials such as nylon, polypropylene, and polyethylene, as well as the different uses that are being made of those materials. It was reported that polyethylene is now extensively used as a trawl-net material in Europe and Japan.

In Japan, 31 million pounds of synthetic nets were produced in 1961 compared with 4.5 million pounds of natural-fiber nets. However, though the conversion to synthetic materials for netting stands at about 90 percent in Japan, this figure shrinks to 20 percent for ropes.

The technical and economic aspects of the two main types of knotless nets--the Japanese type made by twisting and the Raschel type made by crocheting--were discussed at the Congress. It was stated that knotless nets are from 20-30 percent cheaper than knotted ones within certain small-mesh sizes.

One paper stated that Italy is producing 750 tons of knotless nets a year, compared with the production of 500 tons per year of knotted synthetic nets. Production of knotless netting in Norway has increased from 17 to 200 tons a year within a two-year period.

Synthetic fibers have become widely used in the fishing industry mainly, however, in twines made of continuous multifilaments. However, during the past few years, a major breakthrough has been achieved using thick monofilaments, and these are now in extensive use in certain types of gear. One paper from Viet-Nam states that of 11,000 gill nets in operation in that country, about 8,000 are of this (almost invisible) monofilament type, while only 160 are multifilament nets.

World Gross Exports of Fish Oil (Including Fish Liver Oils) 1/, Average 1955-59, Annual 1958-62

Continent And Country	2/1962	1961	1960	1959	1958	Average 1955-59
..... (1,000 Short Tons)						
North America:						
Canada.....	3.5	4.6	15.2	14.8	6.0	8.5
Mexico.....	.2	.8	3/	.7	.7	.7
United States..	61.5	61.2	71.8	72.2	47.0	64.1
Total	65.2	66.6	87.0	87.7	53.7	73.3
South America:						
Argentina....	.8	.6	1.0	.4	.8	.5
Chile.....	12.0	5.1	6.6	.1	-	4/
Peru.....	164.0	112.8	38.6	18.9	1.8	5.5
Total	176.8	118.5	46.2	19.4	2.6	6.0
Europe:						
Denmark....	16.8	10.5	7.4	16.1	12.6	12.5
France.....	2.8	2.7	2.4	1.6	.4	1.1
Germany, West	22.9	25.3	26.2	31.6	17.9	17.9
Iceland.....	72.5	35.2	54.5	18.9	27.4	21.1
Netherlands 5/6/	2.6	5.2	7.8	16.0	13.0	10.4
Norway 6/.....	18.6	24.0	18.4	21.8	19.8	21.3
Portugal.....	6.7	7.4	4.9	5.7	5.5	5.1
Sweden.....	2.0	3.4	2.5	3.0	2.0	2.5
United Kingdom	2.6	3.2	3.7	3.7	3.6	3.8
Other (incl. U.S.S.R.) 7/.....	2.9	2.8	2.0	2.3	1.4	1.7
Total	150.4	119.7	129.8	120.7	103.6	97.4
Africa:						
Angola.....	2.9	3.3	7.3	5.6	9.4	8.1
Morocco.....	4.9	4.5	5.7	4.3	4.5	2.7
So. Africa Rep. 8/	50.4	51.0	37.4	26.6	18.5	15.2
Total	58.2	58.8	50.4	36.5	32.4	26.0
Asia and Oceania:						
Japan.....	3.2	2.7	3.8	3.6	6.6	5.8
Other 7/.....	.7	.8	1.0	1.7	1.2	1.2
Total	3.9	3.5	4.8	5.3	7.8	7.0
World Total	454.5	367.1	318.2	269.6	200.1	209.7

1/Hardened fish oils have been included wherever separately classified in export statistics.

2/Preliminary.

3/Under 50 tons.

4/1959 only.

5/May include some whale oil prior to 1960.

6/Excludes sizable quantities of hardened fish oils exported annually which are not separately classified in trade returns.

7/Includes estimates for minor exporting countries.

8/Includes the territory of South-West Africa.

Source: World Agricultural Production and Trade, U. S. Department of Agriculture.

International (Contd.):

One paper from Germany reported on the use of plastic materials for constructing creels and pots, replacing traditional materials which deteriorate very quickly.

SECOND WORLD FISHING GEAR CONGRESS HELD IN LONDON:

The Second World Fishing Gear Congress sponsored by the Food and Agriculture Organization (FAO), was held in London, May 27-31, 1963, six years after the first Congress in Hamburg in 1957. To those who attended both Congresses, the advances were most obvious in synthetic netting twines, knotless netting, fish detection, and fleet operations. There has been progress, but no spectacular developments in the catching of fish. However, purse seining techniques have become much more effective. Stern trawling is well accepted, even for small vessels and midwater trawling is more widespread. Instrumented gear is the subject of much research, but there has been no major breakthrough. Automated vessels are just on the horizon.

Fish behavior remains a fascinating but complex study with a most promising future. Electrical fishing seems ready to move on from its proven use in accelerating the pumping of fish from nets to improving trawl catches significantly, and, possibly, toward the time when it will aid fishermen to herd and harvest fish somewhat like farmers manage their domestic animals.

While much progress has been made in the last six years, the opportunities for making improvements in the arts of locating, luring, and capturing fish not only are great, but they are worthy of much more effort and funds than are being expended.

More than 500 representatives from 52 countries attended the Congress. The 5 full days of meetings were devoted to 3 major topics: Materials, Gear and Fishing, and Gear Research, under the chairmanship of the Director of a Scottish firm which operates the stern trawlers, Fairfree and Fairtry I, II, and III.

Of the 87 papers presented, 11 came from the United States and one from the United States and Canada. They covered the following subjects: large pelagic trawls; prospective developments; improved heavy trawl gear; shrimp behavior; electrical shrimp trawling gear; fish identification from echo sounder recordings; tuna behavior; electricity in commercial sea fishing; air bubble curtains; king crab pots; hydraulic power and fishing gear; and automatic data processing and computer applications.

United States representatives at the Congress numbered about 15 from the domestic industry and three from the United States Government.

After editing at the FAO Fisheries Division in Rome, the papers and the discussions will be published by Fishing News (Books) Ltd., 110 Fleet Street, London, EC4, in England, with French and Spanish abstracts. The same company published the report of the first Congress, Modern Fishing Gear of the World. (Regional Fisheries Attache for Europe, U. S. Embassy, Copenhagen, June 5, 1963.)

Note: Also see Commercial Fisheries Review, February 1958 p. 51.

WORLD FOOD CONGRESS

INTERIOR SECRETARY STRESSES VALUE OF FISH PROTEIN CONCENTRATE:

The World Food Congress sponsored by the Food and Agriculture Organization (FAO), of the United Nations was held in Washington, D.C., June 4-18, 1963. The U. S. Secretary of the Interior spoke to the Congress on June 6 as follows:

"It is a particular pleasure to meet such a broad spectrum of natural resource interest as is represented in this Congress. As Secretary of what in effect is America's department of natural resources, I have had the opportunity for two years of meeting with various groups--organizations that reflect the diversity of Interior's activities.

"In many of these cross country meetings, I note a subtle--if occasionally minute--change. For on the leadership level of such industries as oil, coal, timber, and fisheries I find more and more men whose conversations denote a movement away from parochial self-interest into the more urgent question of how today can this Nation--this world--manage, utilize and at the same time enhance and protect our natural resources. For everywhere today men are slowly realizing that science and economic drives are a team that improperly guided can run roughshod over the very elements that make the world liveable. For this reason, fishermen become treaty makers; an oil company adjusts its operations to save a herd of Alaska moose or a flock of birds, more and more timbermen curry, rather than denude the mountain-side. . . .

"To meet one of the world's grave resource challenges, the feeding of a growing army of the hungry, we are charting a new route. Aided by men of science, we have set forth to plumb that 70 percent of the earth that remains unexplored--the ocean depths. Thus, we may better discover and utilize the sea's bounties for the world's hungry.

"As President Kennedy observed recently: 'To meet the vast needs of an expanded population, the bounty of the sea must be made more available. Within two decades, our own Nation will require over a million more tons of seafood than we now harvest.'

"The world picture is increasingly grim and Lord Boyd Orr, former director of the U. N. Food and Agricultural Organization, and Nobel Peace Prize winner, states that within 80 years the world must produce more than eight times the present world food supply.

"Today, we in the Department of the Interior are meeting this challenge in a multi-front drive to raise this Nation's harvest from the sea, and at the same time, pass along to the free world, our scientific findings in this field.

International (Contd.):

"The fisheries research programs now under way number into the hundreds. However, one above all others shines as a beacon of hope for the 80 percent of the world's population today receiving insufficient daily protein diet--which is a rather dainty way of describing spirit-sapping hunger that for millions annually is an epitaph.

"This project, which our scientists in the Bureau of Commercial Fisheries have with limited resources virtually led the world in research, envisions the creation and distribution of a fish protein concentrate (FPC).

"This product is made from a whole fish reduced to a protein-rich powder easily added to cereals of other basic foodstuffs. By utilizing the unharvested fish of United States waters alone, it can provide supplemental animal protein for one billion people for 300 days at the cost of less than one-half cent per person per day. The value of fish as a protein supplement has been recognized since the beginning of time. The problem has been one of distribution.

"Harvesting fish is of only limited value if weight, susceptibility to spoilage, or transportation costs preclude shipping from coastal areas into the interior, where there often is a dense concentration of population. This is a baffling problem. It must be solved before fishery products make their full contribution toward solution of the over-all world food problem.

"Fish protein concentrate, however, would overcome the disadvantages of weight, spoilage, and high costs of distribution that are common to many other products. FPC is nutritious, adaptable to many diets, and easily packaged in various sizes. It is an outstanding example of wise resource use.

"We believe that this food supplement, the intrinsic nutritional value of which is already well established, can eventually be obtained by any one of a number of different processing methods and in a variety of forms ranging from a white, bland-tasting powder to a dark, flavorful paste. Further, it can be manufactured from fish species not now used as food. We are convinced that we are at the threshold of a new and important marine food industry which, if it can be helped safely over the first difficult stages of development, will assume a position of major importance both here in the United States and abroad.

"Today, in many parts of the world, and even off our own coasts, vast and sometimes unassessed fishery resources, capable of being converted into fish protein concentrate, are still available. If we are to alleviate the world's hunger and malnutrition these resources must be used to supplement the crops from the land. It seems obvious that these relatively untouched resources of the sea constitute the last unexploited, readily available source of animal protein. Wisely managed, this large renewable resource will contribute importantly toward solution of the very problems under consideration at this Congress.

"It is especially significant that fish and shellfish provide the high-quality protein so essential as a supplement in the food of millions throughout the world who now depend, of necessity, largely on diets of land crops such as cereals and vegetables.

"Much of the world's hunger, ranging from acute, extreme starvation to chronic, marginal dietary deficiencies, is a problem not only of how much food but of what kind. The most serious among the causes of hunger is protein malnutrition, frequently induced by a deficiency of the right kind of proteins, those, in fact that cannot be synthesized by the human organism, and hence should be eaten every day. These essential proteins can be most readily found, in the correct proportions, only in the tissues of animals.

"We in the Department of the Interior are not alone in our research and development work on fish protein concentrate. Other nations, also with both economic and humanitarian motivations, are similarly active. But the Department's program, recently initiated by the Bureau of Commercial Fisheries and now moving into high gear, is accorded a high priority. President Kennedy, in a recent public statement, described the program as vital to this Nation's efforts toward the betterment of mankind. A recent National Academy of Sciences report agrees.

"We are confident that it will be possible to produce a fish protein concentrate containing 90 percent of high-quality proteins at a cost of 10 to 15 cents per pound to the consumer. It has been estimated that the minimum daily requirement of protein, 70 grams, could be supplied through fish protein concentrate at a cost per person of about two cents a day.

"Because a project of this potential and universal significance must be a cooperative

International (Contd.):

effort we have resolved to work in the closest cooperation with the United Nations, and especially the specialized agencies to whom much credit must go for initiating and stimulating new efforts in fish protein concentrate.

"While the idea of manufacturing fish protein concentrate is not new the time has now come to translate that idea into large-scale production of a product that holds such great promise for the benefit of mankind. This much we owe to ourselves and to our friends throughout the world who look to us for help in solving their hunger problems. The day may never come when hunger will no longer stalk the earth. Nevertheless we must not

cease to dedicate our collective minds and energies toward the attainment of that goal."

GREAT LAKES FISHERY COMMISSION

TROUT PLANTING IN LAKE SUPERIOR:

The long-range program to restore the lake trout population of Lake Superior includes a large-scale restocking effort, according to the Assistant Director of the Great Lakes Fishery Commission. This phase of the restoration work was begun in 1958 with the aid of Canadian and United States local and Federal agencies. It has been made feasible by the progress of sea lamprey control. Prior to 1963, nearly 6 million lake trout had been set free in the upper Great Lakes.



Exhibit showing sea lamprey research and control conducted by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Ann Arbor, Mich.

International (Contd.):

Lake Superior releases during 1963 will include more than 1 million yearling lake trout from state and Federal hatcheries in Michigan. Wisconsin will contribute another 320,000 lake trout. In Canada, the Ontario Department of Lands and Forests will add about 512,000 young trout to Lake Superior waters. In addition, a separate release of 1,500,000 fingerling lake trout in Lake Superior is planned in the fall of 1963.

There are high hopes that lake trout survival will continue to improve in Lake Superior. The rate of lamprey scarring in that Lake has remained low throughout most areas since the fall of 1961 as a result of a chemical treatment program in tributary streams during recent years. (News Bulletin, Michigan Department of Conservation, June 6, 1963.)

INTERNATIONAL PACIFIC HALIBUT COMMISSION

NORTH PACIFIC HALIBUT FISHERY REGULATIONS FOR 1963 REVISED:

Approval by Japan, Canada, and the United States of conservation measures for the eastern Bering Sea as recommended by the International North Pacific Fisheries Commission in February 1963 necessitated certain changes in the Pacific halibut regulations.

The International Pacific Halibut Commission issued, effective June 8, 1963, revised regulations for the 1963 fishery. The new regulations superseded those that became effective on March 21, 1963. The changes in the regulation that became effective on June 8, 1963, are concerned primarily with division of Area 3B North into two areas (Area 3B North and Area 3B North Triangle), but many other changes in wording and in the description of the regulatory areas (particularly Area 3B South) have been made.

Some of the changes in the regulations effective June 8, 1963, are as follows:

(1) Area 3B North is divided into Area 3B North Triangle and Area 3B North. Area 3B North Triangle: a triangular area in Bering Sea bounded by lines running from Cape Sarichef along the Aleutian Islands to 170° W., thence north along that meridian to a point near St. Paul Island, thence a straight line to Cape Sarichef, the point of origin. Area 3B North: Bering Sea, not including Area 3B North Triangle.

(2) An annual catch limit of 11 million pounds is set in Area 3B North Triangle.

(3) The length of the seasons in Bering Sea are as follows:

Area 3B North Triangle: From March 25 to a date to be announced by the Commission when the annual catch limit is taken.

Area 3B North: From March 25 to October 15 (formerly October 15 or at the closure of Area 3A, whichever is later.

(4) The opening and closing times are 6:00 p.m. local standard time in Areas 3B North and 3B North Triangle. Elsewhere they are 6:00 p.m. Pacific Standard Time, as previously.

(5) Licenses may be validated for more than one of Areas 3B South, 3B North, and 3B North Triangle, provided that when Area 3B North Triangle is open the intended area of fishing and any change of area is declared in advance.

(6) Licenses of vessels fishing in Areas 3B North or 3B North Triangle must be validated at Sand Point, Alaska, both prior to such fishing and prior to unloading any halibut at any port or place other than Sand Point, Alaska, regardless of whether Area 3A is open or closed.

(7) Halibut may not be taken with nets of any kind, except in waters of Bering Sea west of 175° W. and north of a line running from Cape Newenham to a point close to St. Paul Island as described in Section 12 of the regulations.

Note: See *Commercial Fisheries Review*, this issue p. 94; June 1963 pp. 57 and 62; May 1963 pp. 60, 74, and 91; March 1963 pp. 23, 41, 42, and 87.

NORTH PACIFIC FISHERIES CONVENTION

CONFERENCE OPENED BY INTERIOR SECRETARY:

The parties (United States, Canada, and Japan) to the International Convention for the High Seas Fisheries of the North Pacific, which became effective on June 12, 1953, began discussions on possible revisions in the Treaty on June 6, 1963. The U. S. Secretary of the Interior opened the meetings held in Washington, D. C., with the following statement:

"The discussions which are beginning here today are of great importance to each of the Governments represented. Fishermen of each of the three countries carry on important fisheries in the North Pacific Ocean and they form a major part of local or national economies. Also, a substantial number of people in each country are dependent for their livelihoods upon these fisheries.

"As a consequence each of the Governments is deeply concerned with the problem of insuring the continued prosperity of these fisheries. Each is concerned that the fishery resources which support these fisheries continue to be

International (Contd.):

productive. Each is concerned that the legitimate interests and aspirations of its fishermen be advanced. These alone are important considerations.

"But, these discussions are also important in the context of broader considerations. The nature of the relationships--bilateral and trilateral--among the three Governments is of critical importance to each of the three Governments. Each seeks with the others a pattern of relationships characterized by harmony, sympathetic understanding of each other's problems and a minimum of friction. Each recognizes the value of institutions which aid in the solution of common problems.

"The Convention which you will review in the coming discussions is just such an institution for the solution of common problems. It seems to me that in a review of its effectiveness, the extent to which the Convention has contributed to a pattern of harmonious relations between Governments, ought to be considered, as well as the efficiency with which the Convention has moved toward solution of the fishery problems with which it was designed to deal. In both respects the Convention is important to the three Governments, and a review of its ten years of operation is a task of some moment.

"It is our view in the United States that the Convention has served well as a mechanism for the solution of common fishery problems and in so doing has contributed substantially to a pattern of harmonious relations among the three Governments. This is not to say that there has been no friction. We do think, however, that with almost any alternate agreement which we can imagine there would likely have been greater friction, less harmony. This point can hardly be overemphasized. Regardless of the direct benefits which may have or may not have accrued to national fisheries, our countries have benefited from a period of relative harmony in relationships connected with fishery matters as the result of the existence of this Convention.

"As for the extent to which this Convention has been effective as a means for dealing with fishery problems, the United States has on many occasions made clear its view that the Convention has proved to be a most useful means for dealing with many of the critical fishery problems of common interest in the North Pacific Ocean. The President and various other officials, including me, have indicated the United States view that the underlying principle of the Convention--the abstention principle--is peculiarly applicable and is essential in connection with certain of the fishery problems in the area. The circumstances in the North Pacific Ocean off the coast of North America are unique in terms of long-standing Canadian and American fisheries, and unparalleled investments by the two Governments of time, money and talent in the conservation of the resources. Such unique circumstances must be given adequate recognition. As a practical matter, any pattern of international agreement regarding utilization of those resources which fails to take due account of the special contribution to the productivity of the resources such investments represent will not endure.

"The abstention principle does take due account of the special contribution which in this case has been made by the United States and Canada. It thus serves as a valuable procedure for encouraging governments to undertake the burdensome tasks connected with the conservation of marine fishery resources.

"In addition, if the principle or something akin to it is not available for dealing with this kind of problem as it occurs more frequently, the alternative courses of action which governments are likely to take to protect their fisheries will run contrary to the interests of the three Governments represented here and, in the long run, contrary to the interests of mankind.

"In short, we are convinced of the fundamental value of the principle of abstention for the solution of what are today

unique fishery problems, but problems which may in the future be all too common.

"We are strengthened in our conviction by the manner in which this Convention has served the three Governments during the past ten years. None of the Governments has found in the functioning of the Convention all that it might have hoped for. Japanese fishermen find defects in the Convention, and so do Canadian and American fishermen. But, within its framework it has been possible for the three national fishing industries to prosper.

"I do not wish to give you the impression that we in the United States consider the Convention to have worked perfectly. Indeed, that is not our view, as all who are familiar with the proceedings of the International North Pacific Fisheries Commission can testify. However, the defects which we perceive are not fundamental. They do not go to the heart of the Convention. They are not defects in principle. They are perhaps weaknesses in the use of the instrument more than weaknesses in the instrument itself.

"These defects can and should be corrected; and no doubt the United States Delegation will have specific proposals to this end. Thus, we welcome this review of the Convention. I would be less than candid, however, if I did not emphasize the fact that in essence the Convention is satisfactory to the United States. Such proposals as the United States Delegation may make for correcting weaknesses will not deal with fundamentals of the Convention. These, in our judgment, are best left intact. It seems to us better to seek to improve upon the instrument with which we are familiar and which has, in fact, served well, than to discard it and seek to create a new instrument. The United States Delegation will, of course, be most interested in hearing the views of the Canadian and Japanese Governments and will give the most careful and sympathetic consideration to proposals which they put forward.

"It is our earnest desire that these discussions result in arrangements for the solution of common fishery problems in the North Pacific Ocean which all of the Governments represented here will consider both well suited to the advancement of common conservation interests and equitable."

REVISION PROBLEMS NOT RESOLVED:

The meeting of the Parties (United States, Canada, and Japan) to the International Convention for the High Seas Fisheries of the North Pacific Ocean which began in Washington, D. C., on June 6, 1963, came to a close on June 21.

During the course of the Meeting, the Delegations from the three countries reviewed the present North Pacific Fisheries Convention and discussed the new draft Convention proposed by the Japanese Delegation to determine whether the Japanese proposal or continuation of the present Convention with appropriate clarifications and understandings would provide the better basis for resolving the North Pacific fisheries problems of the three Parties.

The Japanese Delegation, while recognizing the contribution the present Convention had rendered toward the stabilization of fish-

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eries relations in the North Pacific Ocean among the three countries, stated that the abstention formula has in it intrinsic irrationality since it is, in their view, actually designed for the protection of fishery industries of certain countries rather than for the conservation of resources. The Japanese Delegation clarified its position that Japan cannot continue the present Convention having the abstention formula as its base, not only because of the above essential reason, but because of the fact that the great changes which have taken place in the factual circumstances surrounding the Convention during the past 10 years have given rise to many problems next to impossible of solution under the abstention formula.

The Japanese Delegation took the position that the most realistic and practical solution is to replace the present Convention with a new one. They explained that in the draft Convention the abstention formula is replaced by the principle that joint conservation measures will be established on a scientific and nondiscriminatory basis, and that the fishery management conducted by Canada and the United States will be given due consideration in determining joint conservation measures.

Throughout the Conference, the Canadian Delegation supported the abstention principle on which the present Convention is based, as a sound, workable principle designed to provide for conservation and rational utilization of special fisheries which could not long survive without it. Regarding certain difficulties in the application of the terms of the Convention which had appeared during the 10-year period since it came into force, the Canadian Delegation expressed confidence that these problems could be solved through agreed understandings and interpretation of the articles of the Convention.

They stated that experience showed that one of the important problems requiring solution was that caused by the intermingling of fully-utilized stocks of halibut, which are under abstention, with other stocks of bottom fish which are not under abstention. The Canadian Delegation proposed that a just solution to this problem would be to agree that Japan, in carrying out fishing operations for bottom fish in the area south and east of the Alaskan peninsula, would not fish for halibut and would conduct the fishing operations in a manner which will not damage the halibut stocks.

After a careful study of the new draft Convention submitted by the Japanese Delegation, the Canadian Delegation stated that the language of the draft Convention was very general and that no clearly defined principle was included which would form the basis for protection and continued development of the Pacific Coast fisheries of interest to Canadian fishermen. It was pointed out that the Canadian salmon, halibut, and herring fisheries had been developed to a productive level as a result of adherence by Canadian fishermen to restrictive fishing practices over many years and through costly development programs.

The United States Delegation commented on the rapid growth of Japanese fisheries under the present Convention. They pointed out that with the understandings and clarifications proposed by the United States Delegation, this Convention would provide an even more effective instrument for resolving the North Pacific fishing problems, including those resulting from the westward migrations of Bristol Bay salmon. The United States Delegation stated that the Japanese draft Convention was unsuitable in many important respects. They considered that such criteria as it included were so general as surely to lead to great difficulties in implementation and would provide little assurance regarding the actual conservation measures which could finally be agreed upon by the Commission established to administer its provisions. They believed that the present Convention including the principle of abstention provides a clearly defined procedure for dealing with special situations where certain stocks of fish have been made more productive by extraordinary efforts directed to research, strict limitations on fishing and other constructive measures. The present Convention also has provisions for conservation of stocks not qualifying for abstention in terms that are simpler and more straightforward than the draft Convention proposed by Japan.

The United States Delegation concluded that the present Convention provided the best basis for resolving current North Pacific fishery problems and would provide sound and progressive precedents for the development of international practice in this field.

The Conference discussed at length the proposals and views of the three Delegations but was unable at this meeting to reach agreement on terms for the future cooperation of the three countries on North Pacific fishery matters. The three Delegations considered that the Conference had been very useful in promoting mutual understanding of the views of each of the three Parties.

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It was agreed that it would be desirable to give further study to means of resolving the different views of the three countries in the light of the work of this Conference. The Conference therefore decided to adjourn and recommend to the three Governments that efforts to reach agreement be renewed at a second Conference to be convened early in the fall of 1963. (The Conference took note of the hope of the Japanese Delegation that the next meeting be held in Tokyo in September.)

CANADIAN FISHERIES MINISTER REPORTS ON CONFERENCE:

While Canada, Japan, and the United States agree that a convention between them is necessary to maintain the fisheries of the North Pacific in the interest of the fishing industries of their respective countries, the Canadian Fisheries Minister reported to the House of Commons on June 24, 1963, that no agreement has been reached regarding modification of the International Convention for the High Seas Fisheries of the North Pacific Ocean.

The Convention came into force on June 12, 1953, for a 10-year period, following which it could be terminated on one year's notice by either Canada, Japan, or the United States. The Fisheries Minister said that the 10-year period is now over and the recent conference in Washington was held at the request of Japan to consider the possible need for modification of the Convention.

While no agreement had been reached at the conference, the Fisheries Minister said that the problems, including the special protection for Canada's unique salmon, halibut, and herring fisheries and the conservation of the North Pacific fisheries generally, can be solved within the framework of the present Convention, and that the Canadian delegation will in the discussions planned for later this year, endeavor to bring this about.

In his report to the House of Commons, the Fisheries Minister said: "The present Convention, alone among all fisheries treaties, embodies the principle of abstention. Under this principle if one or more of the parties are exploiting a fish stock to the full and are restricting their fishing by regulations based on scientific research in order to maintain that fish stock at a productive level, the other party or parties will abstain

from entering the fishery. In accordance with this principle Japan, under the present Convention, is required to abstain from fishing the important salmon, halibut, and herring stocks of North American origin, and Canada abstains from fishing salmon in the Bering Sea. Our fisheries have in this way had a very large measure of protection from the expanding Japanese high seas fishing operations. There have been some difficulties in the application of the principle of abstention but our experts believe that no stocks which do not qualify now remain under abstention and that all stocks which qualify are under abstention. Continuation of the present Convention including the abstention principle is thus very important to the Pacific fisheries of Canada.

"This Convention has not been popular in Japan because it has restricted the expansion of their fisheries in the northeastern Pacific. Early during the present negotiations the Japanese delegation proposed a revision of the treaty to eliminate the principle of abstention which they claim to be monopolistic and contrary to generally accepted principles of freedom of fishing on the high seas. With this principle removed, the Convention would provide for joint conservation measures but would not afford protection to the fisheries which have been brought by Canada and the United States to high levels of utilization and productivity through great efforts on the part of our two countries. During the negotiations the Canadian delegation supported the principle of abstention claiming that the last ten years have shown it to be an equitable and workable means of maintaining the unique fisheries to which it applies in the North Pacific.

"Our delegation pointed out that the abstention principle had majority support at the Conference on the Law of the Sea and has achieved a large measure of international recognition. The Canadian delegation also pointed out that not only are the stocks of salmon, halibut, and herring, to which the abstention principle applies, fully utilized by our fishermen but have been maintained at their present highly productive levels by strict regulation of our fisheries based on scientific research. Furthermore, our countries have brought these fisheries to their present high levels of utilization and productivity at considerable cost, not only for research and enforcement of restrictions on our fishermen but especially in the case of salmon through positive fish culture measures and through abstaining ourselves from using the rivers in which the salmon are bred for other purposes such as power

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development, irrigation, waste disposal, etc. The maintenance of these fisheries already difficult and expensive would become almost impossible if the benefits of these measures were not reserved for our own fishermen. The Canadian and United States delegations were in accord in insisting on the continued inclusion of the abstention principle in the North Pacific Treaty.

"During the Conference there has been an exchange of views which has clarified the positions of the three parties. The Convention has defined the problems and indicated in a preliminary way some of the possible means of solving them. One of the most difficult problems is caused by the intermingling on the fishing grounds of halibut, which require protection under the abstention principle, with larger stocks of other bottom fish which are not now intensively fished by the United States and Canada and from which Japan has no obligation to abstain. The problem here is to devise means by which Japan can make use of these stocks some of which are already being fished extensively by the Soviet Union while, at the same time, affording protection to the halibut fisheries which have been maintained at a high level by a Convention between the United States and Canada which is one of the oldest and most successful fisheries treaties in existence.

"Although Canada, Japan, and the United States all agree that a Convention between our three countries is necessary to maintain the fisheries of the North Pacific in the interest of the fishing industries of our three countries, no agreement has yet been reached regarding modification of the present Convention to this end. The Canadian delegation believes that all these problems including both the special protection for our unique salmon, halibut, and herring fisheries and the conservation of the North Pacific fisheries generally can be solved within the framework of the present Convention and will endeavor, in the further discussions planned later this year, to bring this about."

The Fisheries Minister reiterated that any tentative agreements reached during the negotiations will be fully discussed before Canada's Parliamentary Standing Committee on Marine and Fisheries before final acceptance by the Government.

**JAPANESE POLITICAL PARTY'S VIEWS
ON REVISION OF TREATY:**

The Japanese Socialist Party's Policy Deliberation Committee, on June 11, clarified the Party's views concerning the Japan-United States-Canada Fisheries Treaty (North Pacific Fisheries Convention). Its purpose was to remind the Japanese Government of Japan's unchanged position that the present Treaty is entirely inequitable and that the voluntary abstention principle has no scientific, rational basis. The Japan Socialist Party insists that the Japanese Government should immediately give notice to the United States and Canada of Japan's intention to formally terminate the present Treaty, and that, during the one year between the time the notice is served and a new treaty concluded, the Government should carefully study developments, taking into consideration the views of the Japanese people.

The Socialist Party's proposals for a new treaty are essentially as follows:

(1) To secure maximum sustained productivity and to serve the interest of mankind, the voluntary abstention principle must be eliminated and a new treaty concluded on the basis of equality, reciprocity, and freedom of the high seas.

(2) To ensure sound management of fishing grounds and rational utilization of fishery resources, establishment of regulatory areas by kind of fishery should be permitted when necessary.

(a) Within the regulatory areas, necessary controls, such as area restrictions (closing certain areas), catch restrictions, fishing season, size limits, and catch limits, should be established.

(b) Regulatory areas and enforcement procedures may be changed if such action is warranted by evidence based on scientific studies undertaken by the commission.

(3) In view of the special characteristics of the salmon fishery, salmon resources in the high seas as well as in territorial waters should be managed under a unified system.

(a) Fishery resource management should be conducted under a joint program. This program should be carried out by an international body to be established under

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the treaty or by the respective contracting parties.

(b) Catch quantity should be determined through agreement among the contracting parties and should be based on evidence obtained from scientific studies of resources in both the high seas and in territorial waters.

(c) Regulatory enforcement on the high seas should be conducted in accordance with the provisions outlined in Item 2.

(4) To preserve and increase fishery resources, the contracting parties should conduct necessary research severally or jointly and exchange data.

(a) The Commission should manage fishery resources in accordance with the provisions of the treaty.

(b) The Commission should conduct scientific investigations necessary to maintain, develop, and conserve fishery resources in treaty waters, collect and analyze data, determine whether it is necessary or advisable to establish joint regulatory measures, and transmit recommendations to the contracting parties.

(c) Decisions of the Commission should be based on the mutual consent of all contracting parties.

(5) Each contracting party, upon receiving notice of the Commission's recommendations, should establish domestic measures to implement such recommendations.

(6) Each contracting party, for the purpose of rendering effective the provisions of the treaty, should enact and enforce necessary laws and regulations, with regard to its nationals and fishing vessels, with appropriate penalties against violations thereof and to transmit to the Commission a report on any action taken by it with regard thereto.

(7) When a person or fishing vessel violates the provisions of the treaty, only authorities of the contracting party to which the offending person or fishing vessel belongs may try said person or vessel and impose penalties.

(8) The new treaty should continue in force for a period of ten years. (Suisan Keizai Shim-bun, June 12, 1963.)

* * * * *

AMENDMENT TO CONVENTION
ENTERS INTO FORCE:

An amendment of the annex to the International Convention for the High Seas Fisheries of the North Pacific Ocean of May 9, 1952, as amended, permits Japan to fish for halibut in a restricted area of the eastern Bering Sea. The amendment is to paragraphs 1(a) and 1(b) of the annex. It was adopted at Seattle on November 17, 1962, at the ninth meeting of the International North Pacific Ocean Fisheries Commission. Acceptances were deposited by Canada on May 8, 1963; by Japan on February 26, 1963; and by the United States on March 23, 1963. The amendment entered into force on May 8, 1963.

NORTHWEST ATLANTIC FISHERIES COMMISSION

THIRTEENTH ANNUAL MEETING
HELD IN HALIFAX, NOVA SCOTIA:

The 13th annual meeting of the International Northwest Atlantic Fisheries Commission was held at Halifax, Nova Scotia, June 3-7, 1963. The Commission is concerned with the investigation and conservation of the major fisheries of the Northwest Atlantic. All 13 member countries were represented. The United States was represented at the meeting by three commissioners, industry advisors, and technical advisors from the U. S. Bureau of Commercial Fisheries.

Some of the actions and discussions at the meeting of interest to the fishing industry were:

(1) The possibilities of establishing minimum trawl mesh sizes in Subarea 5 (Gulf of Maine and Georges Bank south to the vicinity of Block Island) for bottom species other than cod and haddock and minimum ring sizes for sea-scallop dredges. No action was taken inasmuch as there were still insufficient data upon which the Commission could make recommendations.

(2) On the matter of international enforcement of ICNAF regulations further progress was made when it was agreed to seek amendments to the Convention authorizing the Commission to make recommendations to Member Governments for measures of national and international control in the Convention Area.

(3) In discussing problems arising from different fishing customs and interpretations of navigation Rules of the Road by vessels of various nationalities in the Convention Area, it was decided that all Member Nations should be informed of the practices employed by the fishing fleet of each nation. This would draw at-

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tention to any incompatible fishing procedures which can be taken under advisement by the Commission.

(4) Of interest were preliminary statistics of the Soviet catch in the Georges Bank area for 1962. The catches consisted primarily of 151,000 metric tons of adult sea herring and 42,000 metric tons of silver hake (whiting). The United States has no high-seas fishery for adult herring, but does have an extensive fishery for small herring or the sardines utilized by the Maine canneries. The Soviet catch (44,202 tons) for whiting was nearly equal to that of the United States fleet during the same period. From discussion it was indicated that the Soviet catches of herring and whiting were taken with trawl nets of 40 millimeters (about $1\frac{1}{2}$ inches) stretched mesh size. This is somewhat smaller mesh gear than is used by any of the United States fleet fishing off New England for species other than cod or haddock. The sea herring and whiting fisheries in the Northwest Atlantic Ocean are not regulated by mesh size.

(5) Talks regarding an agreement between the International Council for Exploration of the Sea, the Food and Agriculture Organization, and ICNAF on a joint reporting form for fishery statistics of the North Atlantic resulted in a new form being introduced. It was agreed that all European members of ICNAF would begin using the new form immediately, but that Canada and the United States will continue to use present forms through 1963.

(6) The only new information on long-term mesh assessments issued by the Assessment Working Group during the year were those on ocean perch (redfish) for Subarea 5.

(7) Examination of catch and effort data for Subarea 5 lead to the conclusion that the present level of effort on cod is probably higher than that which would give the maximum sustained catch with $4\frac{1}{2}$ " mesh, the legal mesh size. For haddock the present levels of effort appear to provide landings near the sustainable maximum. Further increases in effort would not, in the long run, increase the total landings and could cause them to decrease.

(8) An analysis was made of the differences between natural and synthetic twines. Selection factors for the main types of polyamid (nylon, etc.) and polyester (terylene) were 12 to 20 percent higher than for double manila fibers of the same mesh size—meaning that the synthetics allowed more fish of slightly larger sizes to escape.

(9) Plans for an Environmental Symposium to be held in Rome on January 27 to February 1, 1964, are in an advanced state of preparation. At the meeting it was decided to add another section to the Symposium on "ICNAF Herring and the Environment."

(10) The first phase of the Environmental Survey (NORWESTLANT) in Greenland waters was successfully completed in April and May by vessels of France, Norway, United Kingdom, and U.S.S.R. The second phase involving vessels of Canada, Denmark, Germany, and Iceland was in progress while the meeting was taking place. The third and last phase was planned for July. The results will be published by ICNAF as

soon as possible. The Canadian Oceanographic data Center is processing the hydrographic data.

(11) Recommended that the Continuing Working Party (a joint ICES/FAO/ICNAF statistical committee) continue in existence, as being the best means of providing the essential liaison between the three international agencies responsible for compiling and publishing North Atlantic fishery statistics.

(12) Some progress was made in resolving fish age-determination problems and new techniques of otolith preparation and photography were demonstrated. Plans were made for the exchange of otoliths along with black and white photos or transparencies on which different readers can record their interpretation.

(13) Considerable attention was given to chafing gear. All countries were requested to provide the Secretariat diagrams and descriptions of the types of chafing gear now in use aboard their vessels. Changes were proposed in the regulations that would make illegal the use of any top-side chafer that would obstruct or diminish the size of the meshes of the trawl's cod end. Countries will be formally notified of the proposed changes.

(14) It was proposed that ICNAF consider adopting the ICES minimum mesh of 120 mm. (to be adopted by ICES on June 1, 1964) for taking cod and haddock throughout the ICNAF area. Present minimum legal size trawl mesh is $4\frac{1}{2}$ " (114 mm.) in Subareas 4 and 5, and 4" (102 mm.) in Subarea 3. Commission members agreed to study these problems during the year and attempt to find solutions at next year's meeting.

New officers elected for coming year (1963/64) and for next year's meeting were: Klaus Sunnanaa, Norway, as Chairman, and Frank P. Briggs, United States, as Vice Chairman.

ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT

FISHERIES COMMITTEE MEETS:

The Fisheries Committee of the Organization for Economic Cooperation and Development (OECD) met at Paris, France, July 1-3, 1963. The agenda for this meeting covered: (1) a study of subsidies and other financial support in member countries; (2) suggestions for the 1963-1964 general program of work; (3) sanitary regulations for canned fish; and (4) operational and technical cooperation programs for 1964.

The United States representative at the meeting was A. W. Anderson, Regional Fisheries Attaché, United States Embassy, Copenhagen.

INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

RESEARCH PROGRAM REORGANIZED:

A reorganization of the research program of the International Pacific Salmon Fisheries Commission is under way to meet the conservation problems arising from rapid industri-

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alization of the Fraser River Basin, according to the chairman of the Commission.

Many of the problems of salmon management have been solved on the Fraser River, the chairman stated. However, he added, we are still faced with the growing problem of pollution, the failure of hatcheries to replace successfully natural spawning grounds, and our inability to transplant successfully large self-sustaining runs of either sockeye or pink salmon.

In 1962, the Commission completed an experimental laboratory at Cultus Lake and has been searching for highly trained men to expand the research into several special problems facing the Commission. During the first year of operation at Cultus Lake Laboratory, most of the research has been directed to finding the weaknesses inherent in salmon hatchery methods. A scientist, who is receiving his doctorate in physiology at the University of British Columbia, is in charge of both the hatchery research and the over-all operations of the research station.

The Commission chairman stated, "that with the growth of industry and towns in the Fraser watershed, the Commission was obligated to the Federal Government and to the people for aiding in the technical solution of the highly varied and growing pollution problem." "We must work as partners with government and industry toward the proper control of waste products," added the head of the new pollution research program.

A scientist from the University of Toronto will be in charge of a research section dealing with the problems involved in the transplantation of salmon and their tolerances to environmental changes.

The Commission's decision to expand its research effort was based on the fact that sufficient data were not being obtained from outside sources to meet the Commission's technical requirements for protecting Fraser River sockeye and pink salmon.

TERRITORIAL WATERS

ECUADOR, CHILE, AND PERU MAY BAN FOREIGN VESSELS FROM "TERRITORIAL" WATERS:

Chile, Peru, and Ecuador are reported to be formulating plans to shut out foreign fish-

ing vessels from offshore waters claimed as territorial seas (jurisdiction over 200 miles off their coasts) by those countries. Concerning foreign fishing operations in offshore waters bordering those countries, the Foreign Minister of the Chilean Government on May 28 is said to have remarked as follows:



"The United States and European fishing vessels are ravaging the fishery resources belonging to Chile, Peru, and Ecuador. Wanton intrusions by those foreign vessels into our territorial waters have dealt a grave blow to the fisheries of our three countries. The Chilean Government, in cooperation with Peru and Ecuador, plans to shut out foreign fishing vessels from territorial waters bordering our three nations." (Reported by the Japanese periodical Suisan Keizai Shimbun, May 30, 1963.)

TRADE FAIRS

WORLD FISHING EXHIBITION HELD IN LONDON, ENGLAND, MAY 27-31, 1963:

A wide variety of marine engines, fishing nets, gear, and equipment was shown by over 200 exhibitors from major manufacturing countries at the World Fishing Exhibition which was held at Earls Court, London, England, May 27-31, 1963. The items displayed included filleting machines, freeze-drying equipment, net-making machines, and an electronic device for testing the freshness of fish. This device, according to the West Ger-

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man manufacturer, "measures the freshness of fish instantly (one second)."

The Exhibition was sponsored by leading fisheries organizations in the United Kingdom, World Fishing Magazine, and the London Chamber of Commerce. It was conveniently arranged to coincide with the meeting in London of the Second World Fish Gear Congress which was sponsored by the Food and Agriculture Organization of the United Nations. (United States Embassy, Copenhagen, June 5, 1963.)

Note: See Commercial Fisheries Review, March 1963 p. 44.

INTERNATIONAL WHALING COMMISSION

FIFTEENTH ANNUAL MEETING:

The Fifteenth Meeting of the International Whaling Commission was held in London, July 1-5, 1963. This session was concerned with progress in the program of scientific studies of whale resources which will serve as an objective basis for effective conservation measures.

At its Fifteenth Meeting the Commission resolved as follows:

(1) No change in the opening and closing dates of the Antarctic baleen whaling season.

(2) Complete suspension of whaling for humpbacks in the Southern Hemisphere. At the end of three years the Commission should review the position to determine whether any other action should be undertaken.

(3) Complete suspension of whaling for blue whales in the waters south of 40 degrees south latitude except in the waters north of 55 degrees south latitude from 0 degrees longitude eastwards to 80 degrees east longitude.

(4) By July 1964, the Commission's regulations on whaling should be consistent with the conclusions of the work on assessment of whale stocks carried out by the Committee of Three (composed of one man each from the United States, Canada, and the Food and Agriculture Organization).

(5) Catch limit of 10,000 blue-whale units for the 1963/64 season.

(6) Accepted the invitation from the Government of Norway to hold the Sixteenth Annual Meeting in Sandefjord, Norway, during the week of June 22, 1964.

nual Meeting in Sandefjord, Norway, during the week of June 22, 1964.

The United States delegation consisted of A. Remington Kellogg, United States Commissioner, J. Laurence McHugh, Deputy Commissioner, and three United States Government officials who acted as advisers.

The International Whaling Commission was established in 1948 for the purpose of preserving the dwindling whale stocks through scientific study and regulation of catches.

UNESCO INTERNATIONAL
OCEANOGRAPHIC COMMISSIONMEETING OF INTERNATIONAL
COOPERATIVE INVESTIGATIONS
OF THE TROPICAL ATLANTIC:

A meeting of the International Cooperative Investigations of the Tropical Atlantic (ICITA), a component of the UNESCO International Oceanographic Commission, was held in Paris, France, July 2-5, 1963. The purpose of the meeting was to: (1) review EQUALANT I Midwinter Survey of the Equatorial Atlantic, consisting of some 14 ships of 7 nations between 20° North and 20° South, and between West Africa and South America; (2) review proposals for EQUALANT II (scheduled for August 1, 1963), involving the same geographic area as EQUALANT I and some change in vessels; (3) review proposals for EQUALANT III (scheduled for midwinter of 1964), to be centered in the area of the Gulf of Guinea north to the Canary Islands; and (4) review proposals of the National Oceanographic Data Center for preparation and publication of ICITA Data Reports and Atlases.

The United States was represented by Thomas S. Austin, Chairman, International Coordinator of the Exploration of the Tropical Atlantic, and two advisers (one from the Department of State and one from the National Oceanographic Data Center).

WHALING

ANTARCTIC CATCH, 1962/63 SEASON:

The expeditions of the 5 nations participating in Antarctic whaling caught a total of 11,299 blue whale units during the 1962/63 season, compared with an Antarctic catch of 15,253 units in the 1961/62 and 16,453 units in the 1960/61 seasons. The decline in the catch was due mainly to a reduction in the number of operating fleets (table).

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Antarctic Whaling Fleets, 1962/63 Season With Comparisons						
Country	Factoryships and Catcher Vessels, by Countries, 1960/61-1962/63					
	Season					
	1962/63		1961/62		1960/61	
	Factoryships	Catcher Vessels	Factoryships	Catcher Vessels	Factoryships	Catcher Vessel
	(Number)					
Japan	7	79	7	86	7	83
Norway	4	32	7	71	8	81
U. S. S. R.	4	70	4	67	3	52
United Kingdom	1	9	2	22	2	22
Netherlands	1	11	1	15	1	14
Total	17	201	21	261	21	252
Country	Average Catch Per Catcher Vessel Per Day, 1958/59-1962/63					
	Season					
	1962/63	1961/62	1960/61	1959/60	1958/59	
	(Blue-Whale Units)					
Japan	0.70	0.69	0.86	1.06	0.99	
Norway	0.42	0.45	0.64	0.64	0.92	
U. S. S. R.	0.34	0.42	0.57	0.87	0.97	
United Kingdom	0.48	0.42	0.66	0.60	0.73	
Netherlands	0.36	0.35	0.56	0.65	1.17	
Average catch, all countries . .	0.50	0.51	0.69	0.73	0.95	

The similarity between the average catch rate per unit of effort during the last two seasons may give a deceptive picture of present whale stocks. With the reduction in operating fleets, it would be reasonable to assume that the least efficient units were eliminated. Under equal conditions, such a reduction in catcher vessels ought to have resulted in a somewhat larger average catch per day's effort. But this did not occur, and steadily declining catch rates are sharply evident when comparisons are made with earlier seasons.

The 1962/63 Antarctic season opened on December 12, 1962, for fin and sei whales, and on February 1, 1963, for blue whales. Humpback whales were completely protected in certain areas, and in the other areas they could be taken only during a very limited period in late January. Whaling operations were completed on April 7, 1963. During the 1962/63 Antarctic season, the average hunting period for participating vessels was 111 days. (*Norwegian Whaling Gazette*, April 1963.)

Note: See *Commercial Fisheries Review*, June 1963 p. 85, Sept. 1962 p. 59.



Australia

MARINE BIOLOGIST WARNS OF DECLINE IN SPINY LOBSTER RESOURCE:

A Perth, Australia, marine biologist, who has been studying the spiny lobster fishery

since 1944, has warned of depletion in his recently published book, "The Western Australian Crayfishery, 1944-61." The study follows the growth of the industry from the initial catch of 600,000 pounds to one of 19 million pounds in 1961.

At the beginning of the spiny lobster fishery, only the shallow-water reefs close to shore were fished. Now, powerful vessels fish the offshore reefs, where the risks and the costs are big, but the catch is often small.

The statistical tables in the book show that in the easily fished reefs, the spiny lobsters have declined, and there are more fishermen hunting for them.

The biologist points out that the market for spiny lobster is a luxury market and that good prices have been paid. He says that this has offset the high costs and wasteful competition between all the vessels.

There is no guarantee that prices will stay high; he considers they will fall. The present annual export of frozen spiny lobster tails is about 6 million pounds. He estimates that, in a few years, the market will shrink to three-quarters or half that figure.

People will be driven out of the industry. In other fisheries, experience has shown that others are always prepared to take their place, and live at lower standards. He feels that wise management is helping to offset this tendency.

Australia (Contd.):

The biologist considers that the Government can get nowhere without the support of the fishermen and says that there are laws designed to conserve spiny lobster stocks, but they are hard to enforce.

Fishermen need to understand and obey them voluntarily, for their own good, he states. He added, there can be no security while the immature spiny lobsters are being killed.

He says he would like to see bigger escape gaps in the lobster pots, which would let all the small spiny lobsters escape before the pots are pulled up. Big escape gaps have been made compulsory in parts of Europe, he says, and these should be tested commercially in Australia.

The inner Abrolhos waters are already overfished, and so are the shallow reefs near Fremantle and Geraldton. But north of Geraldton, about 20 miles from shore, the spiny lobsters are still abundant. (Fish Trades Review, April 1963.)

DEVELOPMENT OF A DEEP-WATER TUNA FISHERY BEING STUDIED:

An Australian team of experts will investigate the possibility of developing deep-water tuna fishing in waters near Australia, the Minister for Primary Industry, announced in May this year.

The Minister states, "Tuna are known to be present in large quantities off the Australian coast, but the types of vessel and gear required to catch them, and especially the costs of such operations, present problems.

"The live bait and pole method used by Australian fishermen to catch tuna in the shallow waters close to the coast is not applicable to deep-water fishery.

"A team of experts will visit Japan, Hawaii, and Samoa to investigate the technical and economic aspects of introducing to Australia the longline method of catching tuna.

"It is expected that the investigations will take about three months and that the experts' report will indicate to the Government and to the fishing industry the prospects of success-

fully developing a deep-water tuna fishery on a commercial basis." (Pacific Islands Monthly, June 1963.)

WHALE OIL INDUSTRY TRENDS, FISCAL YEAR 1962/63:

Australian whale oil production has fallen rapidly in the last two seasons and is expected to drop even further in fiscal year 1963/64 (July 1963-June 1964). Only two whaling stations (both on the west coast) are expected to operate this season. With the help of a research grant from the Australian Government, an attempt is being made to improve the west coast operation by concentrating on sperm whale stocks.

On the Australian eastern seaboard, where humpback whales have been very scarce, the whaling stations at Byron Bay, Tangalooma, and Norfolk Island have been shut down and their assets have been offered for sale.

Declining production is expected to sharply reduce Australia's whale oil exports in fiscal year 1963/1964, while whale oil imports should show a moderate increase. New Zealand has

Australian Supply and Distribution of Whale Oil, Fiscal Years 1959/60 Through 1962/63				
	1/1962/63	1961/62	1960/61	1959/60
	..... (1,000 Lbs.)			
Supply:				
Opening stocks ^{1/}	4, 849	4, 354	6, 142	11, 391
Production ^{2/}	11, 581	24, 893	29, 261	33, 297
Imports	2, 500	1, 678	1, 280	754
Total supply	18, 920	30, 925	36, 683	45, 442
Distribution:				
Exports	8, 500	17, 576	21, 255	28, 265
Domestic consumption:				
Margarine and shortening	8, 000	8, 000	10, 274	10, 235
Other uses ^{1/}	500	500	800	800
Closing stocks ^{1/}	1, 920	4, 849	4, 354	6, 142
Total distribution . . .	18, 920	30, 925	36, 683	45, 442
1/Estimated.				
2/Includes production on Norfolk Island.				
Note: Official data in Imperial gallons, converted to pounds with the factor 9.25.				

been Australia's leading supplier of imported whale oil. (United States Embassy, Canberra, May 8, 1963.)

Note: See Commercial Fisheries Review, May 1963 p. 58, October 1962 p. 47.



Brazil

COMMITTEE TO STUDY ADHERENCE TO GENEVA CONVENTION ON LAW OF THE SEA:

On June 11, 1963, the Brazilian Foreign Office announced that (pursuant to Decree No. 52,052 of May 24, 1963), a Commission with a mandate of six months has been formed to study and to make recommendations as to Brazil's "eventual adhesion" to the 1958 Geneva Conventions on the Law of the Sea. The Commission is composed of a chairman, 10 members, and a secretary. (United States Embassy, Rio de Janeiro, June 14, 1963.)



Canada

BRITISH COLUMBIA FISHING INDUSTRY SPOKESMEN OBJECT TO NORTH PACIFIC FISHERIES TREATY REVISION:

Spokesmen for the British Columbia fishing industry are reported as having stated that acceptance of the new North Pacific Ocean fishing regulations proposed by Japan would be a disaster for Canada. The press report adds that the spokesmen said Canada and the United States should do their utmost to keep Japanese fishermen out of the eastern Pacific.

One of the spokesmen was identified as the Secretary-Manager of the Fisheries Association of British Columbia who reportedly said, "If the Japanese were able to fish for salmon on the high seas it would be disastrous for Canada's Pacific fishing industry. We will just have to hope that Canada and the United States can keep the abstention principle in the treaty itself."

The leader of the Fishermen's Union reportedly made the following statement to the press: "The Japanese draft shows Japan is out to seize all Canada's fishery resources. The Fisheries Minister should tell the Japanese that, treaty or no treaty, any action as they have announced will be considered as contrary to the interests of Canada and will be dealt with accordingly. Canada should set forth a minimum proposal for a four-nation treaty, including Russia, banning all mid-ocean fishing."

FISHERY SCHOLARSHIPS AWARDED:

The Fisheries Research Board of Canada has awarded 11 scholarships for 1963/64 to graduate students in various fields of marine biology and oceanography. The scholarships, valued at \$2,400 each, are awarded annually through competition based on scholastic ability. (Information Service, Canadian Department of Fisheries, Ottawa, June 3, 1963.)

GREAT LAKES INSTITUTE RESEARCH PROGRAM FOR 1963:

In 1960, the Great Lakes Institute was established in the University of Toronto. The Institute was charged with the responsibility of encouraging research on the Great Lakes, and supplying research facilities for graduate students in limnology and oceanography.

An important aid to the Institute's studies is the use of the research vessel *Porte Dauphine*, which is operated by the Canadian Department of Transport. A number of launches and small boats provide support for smaller field studies. Cooperating universities, the Ontario Water Resources Commission, and the Ontario Department of Lands and Forests also make laboratories and facilities available to Great Lakes Institute personnel.

A major part of the Institute's 1963 program consists of general purpose lakewide surveys of Lake Erie and Lake Huron. At approximately one-month intervals, about 60 stations are occupied in each lake to collect physical and chemical data, meteorological data, zooplankton samples, and bottom samples for bottom fauna and geological studies.

Water temperature data and meteorological data are being combined in studies of the energy budgets of the lakes, ice formation, and the influence of the lakes upon weather.

A magnetometer survey is being conducted in Georgian Bay and Lake Huron. Seismic (sparker) surveys are planned for parts of Lake Erie in conjunction with geologic studies of the bottom sediments in that lake. The Institute is also supporting studies of diffusion in water by dye techniques in western Lake Erie.

Special physical, meteorological, and biological studies are being carried on concur-

Canada (Contd.):

rently at Douglas Point in Lake Huron at the site of an atomic reactor power plant. Another project is concerned with the development of suitable shallow-water and deep-water towers for use in the continuous recording of meteorological and limnological data out in the open waters of the Great Lakes. The instrumentation for the towers is also under test.

The University of Toronto maintains an office to process and record the Institute's research data which is later published in annual reports. (Newsletter, National Oceanographic Data Center, May 31, 1963.)

JOINT LAKE ERIE RESEARCH PROJECT WITH UNITED STATES PROPOSED:

The Canadian Department of External Affairs has proposed a joint Canadian-United States project for study of Lake Erie on a broad scientific basis, to be carried out during 1963 and 1964. Approval by the Canadian Government of this project is probable. (United States Embassy, Ottawa, June 4, 1963.)

1962 PACK OF PINK SALMON CAUSES MARKETING PROBLEMS:

The very large pack of British Columbia canned pink salmon in 1962, despite somewhat improved market prospects due both to the devaluation of the Canadian dollar and to the lower prices, presented the canners with a major marketing problem.

The over-all result of the good 1962 pack was that by the end of April 1963, only 648,564 cases of pink salmon had been sold, leaving an inventory of 612,375 cases. In terms of past experience, it was believed that at the end of the marketing year, June 30, 1963, Canadian canners would have about 450,000 to 525,000 cases of pinks still unsold.

The price of canned pink salmon has been lowered steadily in order to meet the Japanese and United States competition, and to sell as many cases as possible. In August 1962, due to the fact that the companies were paying higher prices for pinks and had recently granted wage increases to both shoreworkers and tendermen, the export prices were set at

C\$27.50 for halves (8-oz. 96 cans/cs.), and \$26.00 for talls (16-oz. 48 cans/cs.), a moderate increase over 1961. By the end of August 1962, it was clear that the Canadian and United States packs would be very large, and prices were reduced immediately to \$26.00 and \$24.00 for halves and talls, respectively. In October 1962, in order to stimulate greater sales in the United Kingdom, a promotional allowance of 60 cents per case was offered on minimum purchases of 2,500 cases.

In April 1963, in an effort to achieve an increased distribution of Canadian pink talls in the British market, a special price of \$22.00, less a promotional allowance of \$1.50 a case, was set. The effect of this price reduction of \$3.50 per case is an anticipated sale of at least 25,000 cases of this size in the United Kingdom, traditionally a half-pound and quarter-pound market.

The Japanese who had a carryover of about 200,000 cases (98 cans/cs.) of pink halves from the 1962 pack reduced their price in May 1963 by \$2.00 per case to export markets. In an endeavor to meet this competition, Canadian packers further reduced their price on pink halves by \$2.50 per case.

In summary, in August 1962, the initial export prices were set at \$27.50 for halves, and \$26.00 for talls, slightly higher than in 1961. Since then, in an effort to promote and increase the market for pinks, the prices were gradually reduced to the May 1963 prices of \$23.50 for halves and \$20.50 for talls.

In the Canadian market, too, the price of pinks has been reduced over the year in order to move the large stocks which remained unsold, and on which the storage costs were heavy.

It can be said, therefore, that in the export and domestic markets, the canners have been realistic in their efforts to promote sales. In addition, Canadian representatives traveled to all the Common Market countries, to the United Kingdom, as well as to both Australia and New Zealand.

In addition to the large carryover of pinks, there will likely be about 70,000 cases of sock-eye which remain unsold from the 1962 season, and the carryover of coho will be in the vicinity of 100,000 cases. (Fisheries Association of B. C., May 1963.)

Canada (Contd.):

MARKET FOR FISHERY PRODUCTS IN UNITED KINGDOM, 1961-62:

Landings of fishery products in the United Kingdom rank slightly below Canada and constitute only one-quarter of one percent of the gross national product. The industry employs a great many people, however, and adds much to the British diet. Per capita consumption of fish exceeds 18 pounds a year.

Annual landings of fresh and frozen fish total about 850,000 long tons, 15 percent of which is supplied by other countries. Nearly half of the foreign landings are made directly by fishing vessels.

Nearly 85 percent of the fish landed in Britain is still eaten fresh and the short distances from the ports to the main consumption areas make it possible for deliveries to be made within 24 hours. Because of restrictions on some traditional fishing grounds, British trawlers now have to make longer voyages. There are improved methods of freezing a larger portion of the catch at sea, but the installation of these facilities will necessarily take some time. Meanwhile housewives are beginning to realize that fish frozen on the day it is caught is a better buy, even though it may have traveled hundreds of miles after freezing. This has led to larger imports of frozen fish from Iceland, Norway, and a number of other countries, including Canada.

The production of quick-frozen fish has increased sharply in recent years and an unofficial estimate puts the 1962 figure for frozen fish sticks at 44 million pounds. There are 30 brands of frozen fish packs produced in Britain, using 15 types of fish in various forms as well as shellfish specialties. The sizes range from three ounces for smoked salmon to 16 ounces for fillets of cod, haddock, plaice, and lemon sole, but the majority of fish products are put up in 8-ounce and 14-ounce packs. In addition, cod and haddock, the most popular varieties, are marketed in 7-ounce and 12-ounce packs, skinless and boneless cod in 6-ounce, and skinless cod in 7½-ounce and 13-ounce packs.

Britain's exports of fish and fish preparations increased in value from C\$18.9 million in 1961 to \$21 million in 1962. They are far outweighed by imports, which rose from C\$128.4 million to \$180.6 million over the

same period. Japan was the principal supplier of 1962 imports with shipments valued at \$80.7 million, followed by Norway (\$21 million) and Denmark (\$14.7 million). Canada, with \$13.8 million, ranked fourth and increased its sales by \$3.6 million over the previous year.

Out of total fisheries imports of C\$180.6 million, canned salmon accounted for \$90 million, almost double the 1961 figure. The quantity rose from 47 million pounds to 93.2 million pounds, and Japan was responsible for nearly four-fifths of the trade in both years. The table gives the value of imports from the main suppliers in 1957 (the last full year in which canned salmon was under import quota) and in the last two years.

Imports of Canned Salmon into Britain			
Origin	1962	1961	1957
		(C\$'000)	
Canada	10,050	6,684	8,028
Japan	71,184	33,438	13,851
United States	5,151	4,101	3,891
U. S. S. R.	3,555	1,434	7,236
Others	120	174	240
Total	90,060	45,831	33,246

British import statistics do not list the various species of salmon separately, but the latest available information on Canadian exports shows that, although shipments of canned chum salmon were made at approximately the same rate as in 1961, the amount of coho increased by 50 percent. The demand for pinks rose throughout 1962 and the 1961 figure was exceeded in the first six months. The efforts of Canadian exporters to dispose of the record pack of pinks resulted in increased shipments during the later months and by the end of November the total was three times the 1961 figure. The demand for sockeye, Canadian shipments of which exceeded all other varieties combined in 1961, could not be satisfied in 1962 because of the small pack and Canadian sales fell by 30 percent.

There has been a growing trend in recent years to market canned salmon in Britain under the importer's label and consequently only a small proportion of Canadian shipments appears on the shelves with the packer's own label.

With the rising standard of living in Britain, there is a continuing demand for canned lobster, and imports from Canada in 1962 amounted to over \$500,000, double the 1961 figure. In 1961, the demand for Canadian canned sild (sardines) could not be met because

Canada (Contd.):

of the poor season, but in 1962 the supply position improved considerably and this enabled Canadian exporters to double their shipments. A small amount of business was done in other Canadian canned products, including kipper snacks and lobster paste.

Britain's imports of chilled or frozen fish totaled nearly 35,000 long tons in 1961; two-thirds was in the form of fillets. Canada's share of the total was more than 3,800 tons valued at C\$3 million and was made up of 1,800 tons of fillets (principally cod but including some haddock), 800 tons of whole or dressed salmon, and 1,200 tons of other forms (mainly cod blocks). Norway and Iceland are the principal suppliers of frozen cod and haddock fillets, with Denmark supplying the bulk of the plaice. Imports of all fillets from these and other European countries rose in 1962 but imports from Canada fell considerably, partly because the prices obtainable in the United States were higher.

Imports of frozen salmon in 1961 totaled 2,800 tons, 800 of which came from Canada, 1,000 from Japan, 750 from Norway, and 100 each from the United States and Poland. There was a record run of salmon in Scotland and Ireland in 1962 and at one stage it looked as if the proportion being sent for freezing would seriously curtail imports. The 1962 import figures are incomplete but it is clear that, although imports of Atlantic salmon from Canada and Norway were smaller, imports of Pacific salmon increased and the total of all types imported from Canada was greater than in 1961.

About 40 percent of the frozen salmon imported into Britain, including nearly all weighing 6 pounds or more, goes into the production of smoked salmon. Although there is some preference for Japanese chum over the Canadian on the grounds of greater uniformity of color, the smoking trade in Britain considers that Canadian troll-caught coho or silver salmon is more suitable than Japanese chum because of uniformity of size, quality, and color as well as more attractive prices. In 1962, Canadian exporters took advantage of this preference for their coho by trebling shipments over the 1961 figure.

British importers are equally interested in buying frozen halibut from Canada but they were not prepared to pay the high prices in 1962 and the bulk of their purchases were

made in Japan. Frozen lobster meat from Canada is also in demand in Britain but the available supplies did not permit an increase in exports in 1962.

The outlook for Canadian canned and frozen fish in the British market appears generally encouraging. Shipments of frozen fillets may fluctuate with the supply on both sides of the Atlantic, but there is a growing demand for specialty items, including shrimp, cod roe, eels, and live lobsters. (*Foreign Trade*, a Canadian Government periodical, March 9, 1963.)

Note: British pounds converted to Canadian dollars at rate of £1 equals C\$3.00.

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BRITISH COLUMBIA WHALING COMPANY HOPES FOR BETTER SEASON IN 1963:

Five vessels of a British Columbia whaling company left to hunt whales in late April this year, confident of a better season than they had in 1962.



At west coast Canadian whaling station skilled workers use flensing knives to strip off blubber. Giant calipers are used to measure whale.

Two factors gave them some hope that 1963 will prove a better year. The weather was poor last year and there are prospects of some improvement. The other encouraging factor is the acquisition of two new and faster catcher vessels. These, according to an official of the firm, are capable of almost five knots more than the previous vessels and speed is essential in capturing the whales and making a quick delivery to the company's station at Coal Harbor for processing.

The sixth vessel of the 1963 fleet was due to join the fleet later in the season.

Canada (Contd.):

According to the general manager of the firm, there will be no change in the plan of operation this year. The agreement with the fishermen's union with respect to wages and benefits remains practically unchanged from 1962. The only significant change, according to Union officials, was a reduction of C\$6.00 in board charges. However, the contract comes up for revision before any whaling operation gets under way in 1964. (Canadian Fisherman, June 1963.)



Caroline Islands

U. S. FIRM TO ESTABLISH A TUNA FREEZING AND FISHING PROJECT:

A west coast United States firm is to establish a commercial fisheries project at Koror, Palau, in the Caroline Islands Group of the United States Trust Territory of the Pacific.

A contract between the Trust Territory Government and the United States firm calls for the establishment of extensive fishing operations, a plant for freezing tuna, and the training of Micronesians both ashore and afloat. Fish frozen at Koror will probably be exported to the United States firm's canneries elsewhere.

An official press release says: "The opening of Palau to commercial fishing marks the first major step towards large-scale development of the most important natural resource of the Trust Territory, and is expected to lead to similar enterprises in other districts of the Territory, thus stimulating the local economy through increased employment and a higher level of income." (Pacific Islands Monthly, May 1963.)



Chile

PLANS TO TIGHTEN CONTROL OVER FOREIGN FISHING VESSEL LICENSES:

Provisions designating the Chilean Ministry of Agriculture as the sole authorizing agency for foreign fishing vessel permits were contained in Decree No. 332 signed by the President June 4, 1963, and sent to the

Chilean Office of the Comptroller General for approval. These would permit foreign vessels (not working for national plants) to operate within Chile's declared 200-mile fishing limits. The permits had been available from the Chilean Consul at the home port of foreign vessels. Under the new Decree, requests for permits may be forwarded through the Consul or sent directly to the Ministry of Agriculture by mail.

Chile expects a substantial increase in its tuna fleet and feels that there must be more effective protection of its marine resources. Only two licenses were sold to United States vessels in 1962. The general thinking along the northern coast of Chile is that foreign fishing fleets are taking fish which eventually would be caught by Chilean fishermen. (United States Embassy, Santiago, June 29, 1963.)



Denmark

BALTIC FISHERMEN REPORT SOVIET INTERFERENCE:

During the last week in May 1963, Danish newspapers carried reports of Danish fishing vessels being forced from fishing grounds in the southeastern portion of the Baltic Sea near Poland by Soviet warships because naval exercises were to be held in the area. The first report stated a number of cutters from Bornholm, Danish island in the Baltic south of Sweden, were forced to depart in haste, leaving their gear in the sea. One cutter was reported to have been taken to a Polish harbor. Another vessel left 3,000 cod hooks in the water. The skipper was informed he could pick them up again in three days. A salmon cutter left long-lines with about 10,000 hooks. A few cutters were permitted to haul their gear before being sent out of the exercise area which reached 21 nautical miles out from the coast.

A second report stated that warning shots were fired after Danish trawler skippers ignored three Soviet requests to leave. The trawlers then departed from the area, leaving their gear. Danish naval authorities on Bornholm had not heard of shots being fired.



Denmark (Contd.):

A third report stated that the cutter Talone had returned to Bornholm on May 27 after being forced from the area by Soviet warships. It reported that on May 23 a Russian vessel made clear to the Danish vessels that they should depart. Since the latter were in international waters they did not move. Shortly afterwards, the Russian vessel fired at the cutter, presumably tracer bullets. One hit the forward rail of the vessel but did no damage. A larger Russian warship then approached the cutter in such a manner that it was forced to sail away. The cutter had its salmon long-lines out but had started to haul back when the Soviet vessel appeared, so it left 2,400 hooks in the water.

Swedish vessels were reported to have had similar difficulties. The Swedish coastal fishermen's central association had complained to the Foreign Ministry, requesting that a protest be made to the Soviet Union. The Bornholm Fisheries Association had not yet received a complaint from the damaged fishermen but doubted the possibility of favorable action. The Chairman said that complaints had been made before through the main association and the Foreign Ministry but nothing had resulted. Since losses were greater this time, perhaps a complaint would be made.

The fourth report was based on the experiences of two cutters which returned to the Danish port of Lemvig in Jutland on May 29. The Karen Bodil (34 tons) and the Mette Kruse (31 tons) had set their salmon gill nets in the southeast part of the Baltic Sea when, early in the morning they were hailed by a Russian torpedo boat or speedboat which ordered them away from the area because a fleet exercise was to be held. The skippers of the cutters stated they were in international waters since they were more than 12 nautical miles from the coast and explained to the Russians that, at least, they must have time enough to haul their gear. The Russian captain, who had boarded the Karen Bodil, moved his watch hands to eight to indicate that the cutters must be out of the area by then. They were ordered to sail 24 nautical miles farther to the West. Before the crew had finished hauling the gear, the Russian vessel returned and said the cutters must depart at once or it would tow them away. It maneuvered in such a way that it backed into the Karen Bodil and damaged the starboard side. The Russian vessel then took the cutter in tow in a reckless manner under full speed so that water came in over the cutter and the situation became dangerous.

In the meantime, the Mette Kruse had hauled all its gear and also hauled the 70 gill nets which the Karen Bodil had been forced to leave. The Mette Kruse also came in contact with one of the Russian vessels which bumped it but did only minor damage. (Regional Fisheries Attache for Europe, U.S. Embassy, Copenhagen, June 5, 1963.)

DISTANT-WATER FISHING TRIAL DISAPPOINTING:

In early 1963, a Danish steel cutter of 95 gross tons made a month-long trial trip to the Barents Sea with unsatisfactory results. The catch of 44,000 pounds of plaice was sold in Grimsby, England, for only US\$2,900. No new long-distance trips were planned for the vessel in the near future. Few Danish craft participate in distant-water fisheries since fishing in the North Sea and other nearby waters yields better returns. (Regional Fish-

eries Attache, United States Embassy, Copenhagen, May 29, 1963.)

FISHERMEN SEEK LOWER TAXES ON LANDINGS:

The West Jutland Fisheries Association made a strong plea at its general meeting in Hirtshals for a lowering of Government landing taxes in Danish fishing ports. Claiming that fishermen pay no landing tax to their Governments in Norway, Sweden, and West Germany, and a relatively low tax in England, a reduction to 1 percent of the catch's value was sought. The present landing tax is 2 percent plus $\frac{1}{2}$ percent for the auction hall.

The Association supported its position by pointing out that the fishing industry in Denmark was not subsidized like agriculture, and it had not benefited from wage increases given other industrial activities. Furthermore, it was claimed that the fishermen should not pay for harbors to which their activities draw many other persons and provide numerous jobs. (Regional Fisheries Attache, United States Embassy, Copenhagen, June 12, 1963.)

FISHERMEN SEEK SALMON OFF NORWAY:

Twelve Danish salmon cutters fishing for salmon off the Lofoten Islands in northern Norway with gill nets have had very poor catches despite the reports of good salmon fishing which led them to test the area. The 65-foot cutters carry a crew of four and 300-400 gill nets. They fish outside of Norway's 12-mile fisheries limit and, according to the latest newspaper reports, will not be given permission to land their catches in Norwegian ports. (Regional Fisheries Attache, United States Embassy, Copenhagen, June 12, 1963.)

LOWER PRODUCTION OF POND TROUT PREDICTED DUE TO SEVERE WINTER:

Danish pond trout culture has suffered from the effects of a severe winter. It is difficult to estimate the loss, but the total trout output in 1963 may be down 10 to 20 percent from 1962. The normal winter mortality was believed to have increased about 20 percent because it was difficult to feed trout in the fro-

Denmark (Contd.):

zen ponds for about 4 months. Trout egg production was also expected to drop about 20 percent in 1963. However, about 40 million trout eggs were exported to the United States during the spring of this year.



Fresh-water rainbow trout pond at Brøns, Denmark, about 45 miles south of Esbjerg. Originally started by trout pond operators as a research station, it was later offered to the Danish Government for research. Now it is jointly operated by the Government and trout growers. Research is conducted to obtain better growth by experiments in genetics--mating best growers. Dry food from the United States is fed to the young trout, but older trout get fresh fish from Esbjerg.

Danish pond trout exports to the United States in the first quarter of 1963 totaled about 690,000 pounds, as compared with only about 390,000 pounds in the first quarter of 1962. Total pond trout exports to all countries amounted to about 3,380,000 pounds in January-March 1963, only 10,000 pounds less than in the same period of 1962.

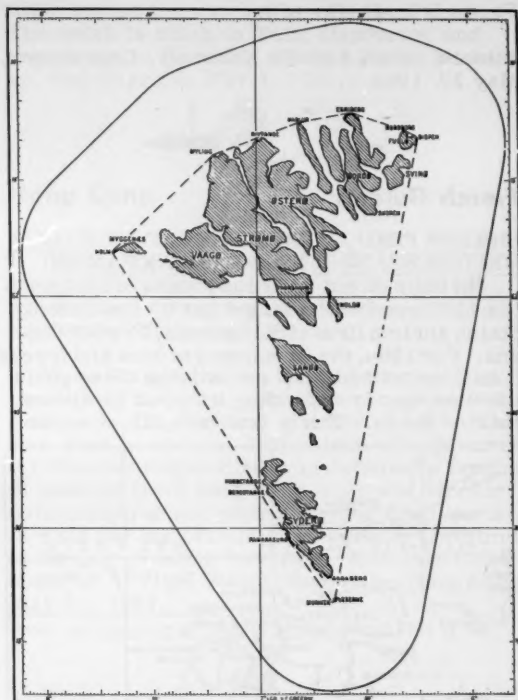
About 100 tons of pond trout were killed in early 1963 when an agricultural pesticide contaminated the river supplying water to numerous trout ponds in Jutland. Newspaper reports estimated the total loss at about US\$435,000. (United States Embassy, Copenhagen, May 29, 1963.)



Faroe Islands

REGULATIONS ON 12-MILE FISHING LIMIT ISSUED:

Regulations establishing a 12-mile fishing limit around the Faroe Islands, beginning March 12, 1964, are given in Regulation No. 156 issued April 24, 1963, by Denmark's Foreign Ministry. Regulation No. 156 (printed in Danish) lists the points between which the baseline is drawn and also includes a



Shows baseline and 12 mile fishing limit around Faroe Islands.

map showing the baseline and the 12-mile limit. (Regional Fisheries Attache, Copenhagen, July 10, 1963.)

DOMESTIC ACTIVITY STIMULATED BY THREAT OF BAN ON LANDINGS IN UNITED KINGDOM:

Faroese representatives have asked the Danish Government for a loan of Kr. 4 million (US\$579,000) to expand a private fishery firm in Klaksvig. The company has fish canning, drying, and filleting facilities, as well as a fleet of trawlers. Half of the loan would be used to improve the firm's fish-drying operation and the balance would be used to expand its filleting and canning activities. The possible loss of landing rights in the United Kingdom has led the Faroese to seek modernization of their domestic facilities as rapidly as possible. The expiration of British fishing rights in the 6- to 12-mile zone around the Faroe Islands after March 12, 1964, has stirred resentment in some segments of the British fishing industry. (Regional Fisheries

Faroe Islands (Contd.):

Attache, United States Embassy, Copenhagen, May 29, 1963.)



French Guiana

SHRIMP FIRM ESTABLISHED BY UNITED STATES INTERESTS EXPANDS:

Shrimp: About 3 million pounds of shrimp is the 1963 production target set by the United States shrimp firm at St. Laurent, French Guiana. For 1964, the firm hopes to pack and freeze 5 million pounds. To accomplish these goals, the company is expanding its plant facilities located there. Thirty trawlers, 22 of which



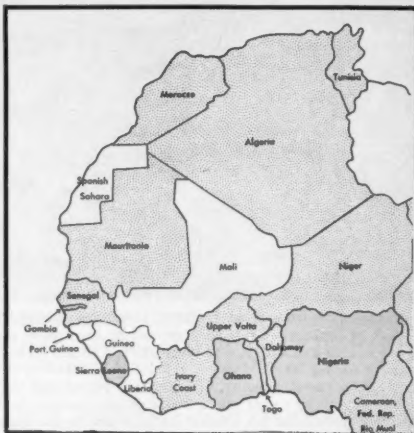
will be all new 68- and 72-footers, are expected to be working out of French Guiana bases by the end of this year. The fleet strength expected to be built up for 1964 is 50 trawlers. The processing plant is located about 8 hours from proven shrimping grounds off the coast of French Guiana, about 21 miles from the coast. The St. Laurent firm started freezing shrimp in December 1962, and already is being expanded. Freezing capacity is being doubled to allow for freezing up to 60,000 pounds of headless shrimp (in 5-pound cartons) at one time.



Ghana

FISH MEAL AND CANNERY PLANTS INCLUDED IN CONSTRUCTION CONTRACT:

The Government of Ghana has signed a US\$40 million contract with a West German company for the construction of a six-factory



complex in Tema. Included are a fish meal plant and a fish cannery. Ghana will pay for the complex on an installment basis after operations begin. (United States Embassy, Accra, May 2, 1963.)



Greenland

FISHING LIMITS LAW MODIFIED TO CONSIDER HISTORIC FISHING RIGHTS:

On May 21, 1963, the Danish Government announced that the extension of Greenland's fisheries limits from 3 to 12 miles would become effective on June 1, 1963. Two modifications of earlier proposals were made. The 7 countries with historic fishing rights off Greenland--France, Iceland, Norway, Portugal, Spain, the United Kingdom, and West Germany--will be permitted to fish in the 6- to 12-mile zone until May 31, 1973, rather than only until October 31, 1970. Line fishermen may fish up to the 3-mile line until October 31, 1963. In connection with its approval of the new fisheries limits, the Greenland National Council asked that scientific fishery investigations be intensified in order that early measures might be taken if overfishing was indicated.

Greenland (Contd.):

West German trawlers and Portuguese line fishermen will benefit most from the concessions. A Government delegation from West Germany had stressed the need for at least 10 years to recoup the investment in large trawlers constructed primarily for fishing off Greenland. Denmark's large exports of fish to West Germany may have influenced the extension of the exemption to 10 years. Portugal's delegation pointed out the difficulties which would be encountered by their line fishermen who work from small dories carried by a large mothership.

The regulations issued are:

(1) Regulation Number 191, May 27, 1963, effective June 1, 1963, establishing Greenland's outer territorial sea as the area within three nautical miles from a baseline drawn between the points listed in section 2.

(2) Announcement Number 192, Ministry for Greenland, May 27, 1963, effective June 1, 1963, limiting fishing, hunting, and whaling in the waters within 12 nautical miles of the inner baseline.

(3) Announcement Number 193, Ministry for Greenland, May 27, 1963, effective June 1, 1963, permitting fishing vessels registered in Iceland, Norway, the United Kingdom, West Germany, France, Spain, and Portugal to fish up to six nautical miles from the inner baseline until May 31, 1973, and to fish with long lines and hand lines up to three nautical miles from the inner baseline until October 31, 1963. (United States Embassy, Copenhagen, May 29 and July 10, 1963.)



Honduras

SHRIMP FISHERY EXPANDS:

The owner of a fish-processing plant in Caratasca has made plans to purchase up to six shrimp vessels from the United States.

Expansion is also planned by a United States firm which operates a mothership in the shrimp and spiny lobster fisheries off the north coast of Honduras. The United States firm has added two 65-foot shrimp vessels to the operation and plans to con-

tinue buying the catch of small local boats. The catch is taken to Tela, Honduras, and then flown to Florida. (United States Embassy, Tegucigalpa, May 4, 1963.)



Hong Kong

FISHERIES TRENDS, FIRST QUARTER 1963:

During the first part of 1963, the new fish-farming industry in Hong Kong was hit hard by extended drought which dried up many of the shallow fish ponds.

Hong Kong's fishing fleet had better luck, increasing its catch slightly to about 24,000 metric tons in the first quarter of 1963. This was done in spite of difficulties with Communist Chinese authorities who detained a number of vessels from both Hong Kong and Macao, ostensibly for not paying the required quota-in-kind for the privilege of working traditional fishing grounds now under Mainland China's control. (United States Consulate, Hong Kong, May 31, 1963.)

Note: See Commercial Fisheries Review, March 1963 p. 65.



Iceland

EXPORTS OF FISHERY PRODUCTS, JANUARY-MARCH 1963:

During January-March 1963, there was a considerable increase in exports of frozen herring and herring meal as compared with the same period in 1962, according to the

Product	Jan.-Mar. 1963			Jan.-Mar. 1962		
	Qty.	Value f.o.b.		Qty.	Value f.o.b.	
	Metric Tons	1,000 US\$	1,000 US\$	Metric Tons	1,000 US\$	1,000 US\$
Salted fish, dried	1,064	21,640	503	934	18,318	425
Salted fish, uncured	2,003	26,252	609	3,216	38,518	894
Salted fish fillets	283	2,313	100	448	8,884	160
Wings, salted	100	1,215	28	150	1,856	45
Stockfish	2,258	90,553	1,405	2,081	74,370	1,726
Herring on ice	6,608	21,880	508	4,742	16,490	383
Other fish on ice	11,308	36,880	1,322	11,554	33,150	1,233
Herring, frozen	14,555	77,253	1,809	5,488	48,026	1,114
Other frozen fish, whole	1,077	13,382	310	788	9,642	224
Frozen fish fillets	9,787	190,834	4,430	11,040	183,480	4,257
Shrimp and lobster, frozen	124	12,040	270	50	5,204	121
Roses, frozen	123	2,383	55	183	3,754	87
Canned fish	93	5,716	133	84	3,366	78
Cod-liver oil	1,917	14,213	330	1,151	8,920	230
Lungfish roses, salted	24	335	8	54	754	17
Other roses for food, salted	1,005	14,077	327	127	1,600	37
Herring, salted	14,180	135,257	3,138	13,111	119,203	2,766
Herring oil	11,044	42,276	981	13,336	58,844	1,365
Ocean perch oil	64	207	5	15	50	1
Whale oil	985	3,658	85	388	2,858	59
Fish meal	3,344	14,515	337	4,965	30,627	711
Herring meal	30,070	130,084	3,018	14,672	90,830	2,110
Ocean perch meal	-	-	-	5	23	1
Wastes of fish, frozen	347	1,072	25	512	1,426	33
Liver meal	130	808	21	90	588	14
Whale meal	-	-	-	232	1,310	30
Whale meal, frozen	6	46	1	86	601	14

Note: Values converted at rate of 1 kroner equals 2.32 U. S. cents.

Iceland (Contd.):

Statistical Bureau of Iceland's Statistical Bulletin, May 1963. Exports of fish meal and herring oil showed a considerable decrease in the first 3 months of 1963.

FISHERY LANDINGS BY PRINCIPAL SPECIES, JANUARY 1963:

Species	January	
	1963	1962
	..... (Metric Tons)	
Cod	9,546	10,144
Haddock	7,545	4,925
Saithe	843	619
Ling	1,098	901
Wolfish (catfish)	251	190
Cusk	1,387	583
Ocean perch	511	384
Halibut	124	105
Herring	48,176	18,222
Shrimp	73	37
Other	328	256
Total	69,882	36,366

Note: Except for herring which are landed round, all fish are drawn weight.

FISHERY LANDINGS BY PRINCIPAL SPECIES, JANUARY-FEBRUARY 1963:

Species	January-February	
	1963	1962
	..... (Metric Tons)	
Cod	23,773	30,554
Haddock	12,265	11,341
Saithe	1,410	2,126
Ling	2,185	2,689
Wolfish (catfish)	948	1,051
Cusk	3,030	1,753
Ocean perch	1,668	1,000
Halibut	235	315
Herring	61,818	23,476
Shrimp	131	127
Other	594	763
Total	108,057	75,195

Note: Except for herring which are landed round, all fish are drawn weight.

UTILIZATION OF FISHERY LANDINGS, JANUARY 1963:

Species	January	
	1963	1962
	..... (Metric Tons)	
Herring^{1/} for:		
Oil and meal	31,220	10,195
Freezing	8,406	2,827
Salting	4,396	1,721
Fresh on ice	4,154	3,480
Groundfish^{2/} for:		
Fresh on ice	3,832	4,103
Freezing and filleting	10,604	8,584
Salting	3,107	2,954
Stockfish (dried unsalted) ..	2,502	1,381
Home consumption	1,365	964
Oil and meal	223	121
Shrimp for:		
Freezing	64	32
Canning	9	4
Total production	69,882	36,366

1/Whole fish. 2/Drawn fish.

UTILIZATION OF FISHERY LANDINGS, JANUARY-FEBRUARY 1963:

Species	January-February	
	1963	1962
	..... (Metric Tons)	
Herring^{1/} for:		
Oil and meal	43,720	10,552
Freezing	8,697	6,043
Salting	4,497	1,721
Fresh on ice	4,904	5,092
Canning	-	69
Groundfish^{2/} for:		
Fresh on ice	7,178	8,790
Freezing and filleting	23,493	23,927
Salting	7,341	12,307
Stockfish (dried unsalted) ..	5,333	4,096
Home consumption	2,350	2,133
Oil and meal	413	338
Shrimp for:		
Freezing	113	121
Canning	18	6
Total production	108,057	75,195

1/Whole fish. 2/Drawn fish.

NEW FREEZER TRAWLER LANDS IN ENGLAND:

The new Icelandic freezer side trawler sailed on her first voyage on May 11, 1963, and after a three-day shakedown cruise near Iceland sailed for Greenland. The new vessel, which is equipped for side-trawling, returned to Reykjavik on June 16 after about 25 days on the fishing grounds. After disembarking half her crew, she sailed for Grimsby, England, where she arrived on June 20. Unloading commenced soon after her arrival and was completed on June 22.

The total quantity of fish landed was 302 tons, all headed except for a few halibut, ocean perch, and dogfish. The fish were mostly medium-size cod, but there were some haddock also. The average daily catch on the fishing grounds was about 16 tons a day and the freezing rate 12 tons a day.

A total of 5,820 fish blocks also was landed. The appearance of the blocks was excellent and was considered better than those landed from the British freezer-trawler Lord Nelson and other vessels, presumably partly due to the improvements in the design of the freezer which ensures better contact between the plates and the fish. Great care had been taken in washing and bleeding before freezing, which also contributed to the excellent appearance. (Note from J. & E. Hall, Ltd., Dartford, Kent, England, June 28, 1963.)



Indonesia

CANNED FISH MARKET LIMITED:

The market for imported canned fish in Indonesia is limited due primarily to restrictions on the use of scarce foreign exchange for such products. Imports of canned fish in 1960 and during the first nine months of 1961 consisted of about 90 percent

Indonesian Imports of Canned Salmon and Sardines, 1960 and January-September 1961				
Product and Country of Origin	Quantity		Value	
	Jan.-Sept. 1961	Year 1960	Jan.-Sept. 1961	Year 1960
	.. (Metric Tons) ..		.. (US\$1,000) ..	
Canned Salmon:				
Japan	1	5	2	7
United States ..	2	1	2	2
Other	-	2	-	2
Total	3	8	4	11
Canned Sardines:				
Japan	498	947	125	232
United States ..	2	-	1	-
United Kingdom ..	5	14	2	3
Netherlands ..	7	64	3	17
Portugal	2	1	1	1
Norway	9	-	6	-
Singapore	-	60	-	13
Other	-	3	-	1
Total	523	1,089	138	267

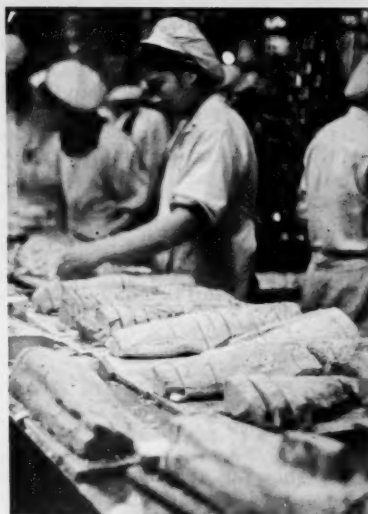
Japanese canned sardines (believed to be mostly low-value canned saury). Small quantities of canned sardines and salmon were imported from the United States in both 1960 and during the first nine months of 1961. (United States Embassy, Djakarta, June 10, 1963.)



Japan

CANNED TUNA IN BRINE SALES TO UNITED STATES:

The Japan Export Canned Tuna Packers Association held a directors' meeting June 25, 1963, to discuss the sixth sale of canned tuna in brine for export to the United States and to review production plans. The Association directors voted to offer for sale a total of 130,000 cases of canned tuna in brine but did not specify the amount of each kind of pack (white meat or light meat) to be sold. They also decided to hold export prices at the same level as the fifth sale, i.e., \$10.50 a case for canned white meat tuna and \$7.65 a case for canned light meat tuna both prices f.o.b. Japan, for No. 1 (7-oz.) 48's. Sales of canned tuna in brine up to and including the fifth sale totaled 1,180,000 cases (690,000 cases of white meat tuna and 490,000 cases of light meat tuna).



Slicing cooked tuna loins for canning in a cannery located in Hiroshima, Japan.

Also at that meeting the directors approved the proposal to increase production of institutional-size packs of canned white meat tuna (in view of depressed sales of standard 7-oz. packs) put up by the Shizuoka packers, who pack 75-80 percent of Japan's total canned tuna pack for export. The following production ratio was adopted by the Association:

Pack Size	Production Ratio	
	New	Old
	.. (Percent) ..	
White meat, No. 1/2 (7-oz.) 48's	35	55
White meat, No. 1 (13-oz.) 24's	30	20
White meat, 4-lb., 6's	35	25

Reportedly, as a result of depressed export canned tuna sales and inventory buildup, Japanese tuna packers may soon run short of operating funds. To help finance their operations, they were reported in mid-June to be seeking a 1.5-billion-yen (US\$4,167,000) loan from the government. (Suisan Keizai Shimbun, June 18, 21, & 27; Suisan Tsushin, June 26 & 27, 1963.)

PRICE FOR JUNE-JULY EXPORTS OF CANNED TUNA IN BRINE UNCHANGED:

A meeting of the Japan Canned Foods Exporters Association was held on May 28, 1963, to discuss the 5th sale of canned tuna in brine

Japan (Contd.):

for export to the United States. At this meeting, the Association members agreed to offer for sale 130,000 cases of canned tuna in brine (80,000 cases of white meat tuna and 50,000 cases of light meat tuna) for delivery during June and July 1963. Export prices were US\$10.50 per case (7-oz. 48 cans/cs.) for white meat tuna and \$7.65 per case (7-oz. 48 cans/cs.) for light meat tuna, f.o.b. Japan. These prices were unchanged from the previous sale of 250,000 cases for May-June 1963 delivery. (*Nihon Suisan Shimbun*, May 31, 1963.)

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FROZEN TUNA SALES AGREEMENTS WITH U. S. CANNERS CONCLUDED:

The United States import market for frozen tuna was showing clear signs of improvement in late June 1963, according to a Japanese press report. Reportedly, in late June Japanese frozen tuna exporters concluded a number of sales agreements with United States tuna packers involving a total of about 5,000 short tons of albacore. Export prices were reported at \$330 a short ton c. & f. Pacific coast (\$280 f.o.b. Japan), and \$320 a short ton c. & f. Puerto Rico.

The price for tuna deliveries to Samoa in June was reported to be \$295 a short ton for round albacore and \$250 a short ton for gilled and gutted yellowfin. (*Suisan Tsushin*, July 1, 1963.)

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FROZEN TUNA EXPORTS TO UNITED STATES, APRIL-JUNE 1963:

Data compiled by the Japan Frozen Tuna Producers Association on frozen tuna approved for export to the United States from Japan proper for April-June 1963 indicate

Frozen Tuna Approved for Export to U. S. from Japan Proper, April-June 1962 and 1963		
Type	April-June	
	1963	1962
... (Short Tons) ...		
Albacore:		
Round	90	3,267
Loin	67	61
Fillet and/or dressed ^{1/}	4	0
Yellowfin:		
Gilled and gutted	3,290	9,907
Loin	278	1,190
Fillet	33	2,199
Dressed ^{1/}	0	371

^{1/}Gilled and gutted with head and tail removed.

that exports during that period were drastically below similar 1962 exports. (*Suisan Tsushin*, July 3, 1963.)

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EXPORTS OF FROZEN TUNA TO UNITED STATES LOWER IN JANUARY-MAY 1963:

Exports of frozen tuna to the United States during the first five months of 1963 via Japan amounted to 18,761 short tons as compared with 31,222 tons in the same period of 1962. The drop in direct frozen tuna exports from Japan proper was partially compensated for by an increase in exports transshipped from the Atlantic Ocean tuna fishery. Exports from that source to the United States rose 24.7 percent, or from 15,391 tons in January-May 1962 to 19,199 tons this January-May. Over-all exports (Japan proper and transshipped Atlantic-caught) of frozen tuna to the United States in January-May this year were down 18.6 percent from the same period of 1962.

Japanese Frozen Tuna Exports, 1/ January-May 1963							
	Year	Jan.	Feb.	Mar.	Apr.	May	Total
..... (Short Tons)							
To United States via Japan:	1963	3,962	4,722	7,139	1,738	1,200	18,761
	1962	5,770	6,488	4,979	8,288	5,697	31,222
To United States from Atlantic Ocean fishery:	1963	4,343	4,284	4,808	3,827	1,937	19,199
	1962	3,844	4,010	4,419	1,844	1,274	15,391
..... (Metric Tons)							
To Europe 2/:	1963	4,075	3,335	2,486	5,736	3/5,937	21,569
	1962	3,344	400	2,436	4,212	3,428	13,820

^{1/}Data compiled by Japan Export Frozen Tuna Producers Association.

^{2/}Italy principal market.

^{3/}Includes exports up to May 18 only.

Lower exports of frozen tuna to the United States were partially compensated for by an increase of about 56.0 percent in exports to Europe (chiefly Italy) this January-May as compared with January-May 1962. (*Nihon Suisan Shimbun*, May 29, 1963.)

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ATLANTIC-CAUGHT FROZEN TUNA PRICES, MID-JUNE 1963:

Export prices of Japanese Atlantic-caught frozen albacore to Italy in mid-June 1963 were quoted at US\$365-370 per metric ton, c. & f. Transshipments of Atlantic-caught albacore to the United States were quoted at \$285 per short ton, f.o.b. Trinidad, and \$270-\$275 per short ton, f.o.b. Africa.

A Japanese trading firm was reported to have concluded an agreement with Spain to deliver 450 short tons of Atlantic-caught albacore at \$400 per ton, c. & f. The same firm is also reported to have concluded an agreement with Czechoslovakia for 200 short tons of skipjack tuna at \$240 per ton, c. & f. The skipjack were caught by pole-and-line vessels based at Freetown, Sierra Leone.

Japan (Contd.):

Italy was reported to be offering \$200 per short ton, c. & f., for skipjack. (Suisan Tsushin, June 17 and 19, 1963.)

EXPORTERS REPORT SALE OF U. S.-CAUGHT FROZEN TUNA TO ITALY:

According to a Japanese periodical, a United States tuna packer is reported to have sold from 1,500 to 2,000 tons of United States-caught tuna to Italy.

Japanese tuna industry members are following this latest development closely for it may possibly affect their sales of tuna to Italy. They consider that this unusual development, even though it may only be temporary, points to the extreme seriousness of the canned tuna sales problem in the United States. (Suisan Tsushin, June 10, 1963.)

ITALIAN MARKET FOR ATLANTIC-CAUGHT TUNA FIRM:

The Italian frozen tuna market in early June 1963 was reported to be quite firm despite earlier forecasts of price weakening in that country. Export prices of Japanese Atlantic-caught yellowfin tuna delivered to Italy were quoted at US\$380-385 per short ton, c.i.f. Italy. A later shipment reportedly sold for \$390 per short ton, c.i.f. Italy.

The executive director of the Italian Packers Association is said to have informed Japanese frozen tuna exporters that Italian packers could absorb about 9,000 tons of Japanese tuna during July-September 1963, and that they may also purchase a similar quantity of frozen tuna during the October-December period. This has prompted many Japanese packers to reconsider their earlier plan of bringing back to Japan excess quantities of Atlantic-caught tuna. (Suisan Tsushin, June 6, 1963.)

TRANSSHIPMENT OF FROZEN TUNA TO SPAIN AUTHORIZED:

The Japanese Government is reported to have authorized frozen tuna exports (transshipments) to Spain proper totaling 5,000 short tons per year. The Government's decision was made in an attempt to overcome the current sluggishness of frozen tuna ex-

ports to Europe and to the United States. Tuna transshipments to mainland Spain had long been sought by Japanese frozen tuna producers and exporters, but the Government had been prohibiting exports to Spain for fear that Japanese tuna packed in that country would be exported to the United States where it would compete with Japanese canned tuna.

It is reported that the Spanish Government is not likely to issue import licenses until the summer tuna fishing season is over, in order to protect domestic fishermen. (Minato Shim-bun, June 1, 1963.)

SUMMER ALBACORE TUNA FISHERY:

The 1963 summer albacore fishing season, which as of early July was practically over, was described by Japanese press reports as one of the best in recent years. A total of 24,000 metric tons of pole-and-line albacore (iced fish) was landed during the season. This represents a fourfold increase over the 1962 catch and the highest since 1957, when about the same quantity was landed.

Data published by the Japanese Fisheries Agency's field station at the tuna port of Yaizu, Shizuoka Prefecture, indicate that landings at that port for the period April 26-June 30 totaled 11,671 short tons. For the same period in 1962, a total of 2,519 short tons was landed.

According to the Fisheries Agency's data, ex-vessel albacore prices paid at Yaizu held steady for the greater part of June, ranging between 120-135 yen a kilogram (US\$302-340 a short ton), but trended downward in late June about \$10-20 a short ton. According to fish price quotations in one Japanese periodical, on July 4, a low of 115 yen and high of 119 yen a kilogram (US\$290-300 a short ton) were paid for iced fish landed at Yaizu. (Japanese Fisheries Agency Fishing Condition Charts, 1963; Suisan Tsushin, July 2; Suisan Keizai Shimbun, July 5, 1963.)

LANDINGS OF SUMMER ALBACORE HIGHER AS OF EARLY JUNE 1963:

Good catches of summer albacore were made by Japanese pole-and-line fishermen operating out of home ports in the first 10 days of June 1963. Ex-vessel albacore prices, despite the heavy landings, were reported to be holding relatively steady, ranging from 125-130 yen per kilogram

Japan (Contd.):

(US\$315-\$328 per short ton). Landings at Yaizu of summer albacore during the first 10 days of June amounted to 3,322 short tons as compared with 820 tons landed in a similar period of 1962. May 1963 albacore landings totaled 5,859 tons or about 84 percent more than the 3,192 tons landed in May 1962. (Suisan Tsushin, June 13, 1963, and other sources.)

ALBACORE TUNA FISHERY
TRENDS, MAY 1963:

A total of 5,169 short tons of pole-and-line caught albacore was landed in May 1963 at the Japanese tuna port of Yaizu, according to data compiled by the Fisheries Agency's summer field station located at that port. Ex-vessel prices trended downward toward the end of the month, closing with a high of 138.5 yen per kilogram (US\$349 per short ton) and a low of 123.5 yen per kilogram (\$312 per short ton) on May 31. According to a Japanese press report, albacore landed at Yaizu on June 7 sold at prices of from 121-130 yen per kilogram (\$305-\$328 per short ton); and at Misaki 330 short tons of albacore (iced fish) brought 108-129 yen per kilogram (\$272-\$325 per short ton).

According to data published by the Fisheries Agency, albacore fishing during the latter part of May was generally conducted in the area bounded by latitudes 31°5' N.-34° N. and longitudes 143° E.-148° E., but the pole-and-line vessels were concentrated mainly along 144° E. longitude between 32° N.-34° N. latitudes. Good catches were reported in that area, with many vessels reporting catches of 10-30 tons per day. (Suisan Keizai Shimbun, June 8, 1963.)

SMALL TUNA CANNERS COMBINE
TO OVERCOME SUPPLY PROBLEM:

In an effort to stabilize prices and to assure a supply of raw material, 18 Shizuoka Prefecture tuna cannery firms contracted with a prominent Tokyo trading firm for 3,500 tons of ship-frozen albacore. The price to be paid for the albacore by the tuna cannery firms will be determined by ex-vessel prices and the export price for canned tuna. The actual price will therefore vary during the contract year (ends March 1964).

The 3,500 tons contracted for is about one-tenth the annual requirements of raw tuna for canning needed by the 18 Shizuoka firms. The Tokyo trading firm has interests in a large cold-storage warehouse at Shimizu and another located in Tokyo.



Frozen tuna at Tokyo Wholesale Fish Market. The fish were landed by the long-liner in the background.

The Shizuoka tuna-packing firms have, in the past, bought tuna for canning at the day-to-day market price. Due to the small size of the individual firms and the lack of capital, they have often failed to purchase supplies when the market price was low. At other times, when supplies were light, the packers were forced to search for fish in several major ports. Under the new contract the supply problems of those small cannery firms (often pack other products such as mandarin oranges) will be partially solved. (Japanese periodical, June 12, 1963.)

TWO TUNA MOTHERSHIPS LEAVE FOR
FISHING GROUNDS OFF MEXICO:

On June 5, 1963, the Japanese tuna mothership Keiyo Maru, with eight 20-ton steel catcher-vessels aboard, left Japan for the tuna fishing grounds off the west coast of Mexico. The Ishiyama Maru, another tuna mothership with the same number of catcher-vessels, was scheduled to depart later for the same area. (United States Embassy, Tokyo, June 6, 1963.)

HALIBUT FISHERY TRENDS, JUNE 1963:

Japanese fleets operating in the "Triangle Area" in the eastern Bering Sea are reported to have landed a total of 1,230 tons of halibut

Japan (Contd.):

as of June 11, 1963. Japanese motherships believed to be fishing in the new Area 3B North Triangle are: Fuji Maru No. 3, 1,200 gross tons (5 catcher vessels); Chiyoda Maru, 2,068 gross tons (12 catcher vessels); Seifu Maru, 8,269 gross tons (28 catcher vessels); and the Chichibu Maru No. 2, 1,693 gross tons (7 catcher vessels). (Shin Suisan Shimbun, June 17, 1963, and other sources.)

The European halibut market is reported to be brisk and Japanese trading firms are reported to have concluded contracts to deliver several hundred tons of halibut to Europe at 40-42 U. S. cents a pound, c. & f. Japanese-caught halibut delivered to the United States eastern seaboard was quoted at 34-35 cents a pound, or about 10 cents a pound lower than a year ago.

Halibut landed in Japan by the major fishing companies is quoted at about 185 yen per kilogram (23.4 cents a pound), while halibut landed by the smaller vessels is quoted at 140-145 yen per kilogram (17.7-18.3 cents a pound). (Suisan Tsushin, June 18, 1963.)

Editor's Note: The International Pacific Halibut Commission announced that as of June 23, the Japanese had taken 3.2 million pounds out of Area 3B North Triangle and that the 11.0-million-pound quota set for that area had not yet been reached.

PRICE REDUCED FOR 1962 PACK OF CANNED PINK SALMON:

The Japanese Canned Salmon Sales Company on May 23, 1963, announced and made effective immediately a price cut of US\$1.00 per case (8 oz. 48 cans/cs.) for fancy grade canned pink salmon. The new f.o.b. quotation reduced the price per case from \$11.30 to \$10.30. The Japanese exporters hoped the price cut would stimulate interest in the United Kingdom market. However, shortly after the drop in the Japanese export price, the Canadian salmon packers decreased their export price for canned pink salmon by \$1.25 per 48-can case, thereby nullifying the advantage the Japanese had hoped to gain in the British market.

The Japanese sales company is concerned with the problem of marketing an estimated carryover from the 1962 pack of pink salmon of about 360,000 cases before the marketing season begins for the 1963 pack.

The Japanese salmon motherships engaged in the North Pacific 1963 fishing season report that both pink and chum salmon are abundant. Usually pink salmon are scarce in the early season catches. (Japanese periodical, May 28, 1963.)

JAPANESE WILL NOT FISH KING CRAB SOUTH OF ALASKA PENINSULA THIS YEAR:

The Japanese Fisheries Agency will defer the issuance of licenses to take king crab south of the Alaska Peninsula, pending further discussion with the United States at the September 1963 meeting on the North Pacific Fisheries Convention. The decision was made after the Fisheries Agency met with its Advisory Committee (Japanese Fisheries Council) on July 10, 1963.

The two fishing companies that had applied for the licenses stated that the action of the Fisheries Agency would prevent king crab operations south of the Alaska Peninsula in 1963. The two companies, therefore, requested permission to take king crabs in Bristol Bay for the remainder of the 1963 season. Their proposal was rejected by the Fisheries Agency because of the high level of the king crab fishing effort and low level of production in Bristol Bay. (United States Embassy, Tokyo, July 12, 1963.)

NEW RESEARCH VESSEL PLANNED FOR FY 1964:

The Japanese Fisheries Agency is planning to request funds in FY 1964 (April 1964 to March 1965) to construct a 1,500-ton research vessel. The Agency plans to utilize the research vessel for conducting investigations on bottomfish in the Bering Sea during the winter months, and also whale research in the Antarctic area. (Suisan Keizai Shimbun, June 9, 1963.)

REVISION OF REGULATIONS ON TRAWL FISHERY PROPOSED:

The Japanese Government, which has been studying the problem of its trawl fishery, is reported to be planning on relaxing regulations governing the transfer of vessels to the distant-water trawl fishery (mostly in Atlantic Ocean and New Zealand waters) from other trawl fisheries which employ small draggers, such as the coastal and offshore trawl fisher-

Japan (Contd.):

ies. This measure is being undertaken to assist operators of small and medium trawlers who, heretofore, had been barred from engaging in distant-water trawling due to the limited size of their vessels and their lack of overseas marketing outlets.

Under the proposal being studied by the Japanese Government, which was expected to be put in force in July, operators of small and medium trawlers will be able to build larger trawlers through a vessel conversion program, which basically involves the retirement of so many small vessels for every larger vessel built. The Japanese Government intends to license, under this program, the construction of about 15 trawlers for operation in the Atlantic Ocean and about 10 trawlers for operation in New Zealand waters.

At the present time, approximately 40 large trawlers, mainly in the 1,500- to 3,000-ton class owned by the large fishing firms, are licensed as distant-water trawlers. The majority of those vessels are operating in the Atlantic Ocean off the west coast of Africa. (Nihon Suisan Shimbun, June 12, 1963.)

TRAWLER IN NORTHWEST ATLANTIC REPORTS GOOD COD CATCHES:

The Japanese stern trawler Aoi Maru No. 2 (1,386 gross tons), which has been fishing in the northwest Atlantic Ocean since late 1962, was reported to be making good catches of cod in the spring of this year. The catches were averaging about 15 tons a day.

Fishery products processed by the Aoi Maru are being exported to the United States. As of the early part of 1963, two shipments had been made. (Shin Suisan Shimbun Sokuho, June 8, 1963.)

NEW STERN TRAWLER LEAVES FOR WEST AFRICAN AREA:

A large Japanese stern trawler, Kiso Maru (2,500 gross tons), departed Kyushu, Japan, on June 3, 1963, on her maiden voyage to the West African trawl fishing grounds.

The Kiso Maru is the 7th trawler to join the vessel owner's trawler fleet. Another 2,500-ton trawler, Kurama Maru, which was scheduled for completion in August, is being

built by the same company. (Minato Shimbun, June 4 and 6, 1963.)

MODERN CAN-FABRICATING PLANT COMPLETED:

The largest can-fabricating plant in Japan was completed on June 5, 1963. Located in Yokohama, it is designed for the manufacture of cans used for packing food only. The plant has 8 modern automatic can-making lines. The Director of the Japan Export Canned Tuna Manufacturers Association observed: "By this, Japan's can-making industry has attained the top class in the World." The manager of the new plant praised the modern layouts and said that the can-making lines will be increased to 15 in the future. (Japanese periodical, June 6, 1963.)

AGREEMENT PERMITS HARVESTING OF SEaweEDS OFF SOVIET ISLAND:

According to a Soviet-Japanese agreement signed in Moscow on June 10, 1963, 300 Japanese vessels are to be permitted to fish for seaweeds off the Soviet Island of Signalny through September 30, 1963 (Tass, June 10, 1963).

NEW FISHERY LANDINGS RECORD ESTABLISHED IN 1962:

Japan landed a total of 6,860,000 metric tons of fish and shellfish (including seaweed and kelp but not whales) in 1962, a new record according to data released by the Japanese Government's Statistics and Survey Division, Ministry of Ag-



Fig. 1 - Japanese trawler in the Bering Sea with a deckload of flatfish.

Japan (Contd.):

Table 1 - Japanese Landings of Marine & Fresh-Water Fishery Products, 1955-1962

	Year							
	1962	1961	1960	1959	1958	1957	1956	1955
	..... (1,000 Metric Tons)							
Grand Total	6,864	6,710	6,192	5,884	5,506	5,407	4,772	4,907
Fish 1/	4,979	5,081	4,523	4,326	4,079	3,940	3,500	3,593
Shellfish 2/	509	498	503	464	457	447	388	333
Other marine animals 3/	5/	702	776	753	627	614	555	645
Sea plants 4/	5/	425	387	337	339	403	327	334

1/Includes fresh-water and marine fish. Whales excluded.

2/Includes hard-shelled shellfish (including pearls) but not species listed under "other marine animals."

3/Includes squid, lobster, crab, shrimp, frog, sea urchin, and sea cucumber.

4/Includes seaweed and kelp.

5/Data not available.

Source: Japanese Ministry of Agriculture and Forestry. (Annual Report of Catch Statistics on Fishery and Agriculture, 1961; *Suisan Keizai Shimbun*, June 30, 1963.)

riculture and Forestry. The 1962 landings represent an increase of 2.3 percent over the 1961 landings of 6,710,000 metric tons. This is the smallest increase since 1958. From 1959 on, Japanese landings of marine and fresh-water products have been increasing at the rate of over five percent annually.

Despite the increase in 1962 in total fish and shellfish landings, landings of finfish actually declined by 102,000 metric tons or two percent, whereas landings of shellfish and other marine products apparently increased.

In 1962, Pacific and jack mackerel led all finfish landings (not including shellfish and sea plants)--their combined landings were about 900,000 metric tons (18 percent of the total



Fig. 2 - A typical Japanese fishing village near Ito.

fish landings). They were followed by tuna--604,000 metric tons (12 percent); flatfish--501,000 tons (10 percent); saury--483,000 tons (9.7 percent); Alaska pollock (whiting)--452,000 tons (9.1 percent); and anchovy--349,000 tons (6.4 percent). Together those species made up nearly two-thirds (65 percent) of the total 1962 finfish landings.

The large increase in landings (in percentage) since 1955 of Alaska pollock, cod, and flatfish is the result of the accelerated expansion of the so-called northern water (Okhotsk Sea, Bering Sea, and North Pacific Ocean) fisheries.

The decline in salmon catch is the result of imposition of catch quotas by the International Pacific Northwest Fisheries Commission (Japan and the U.S.S.R.).

Table 2 - Japanese Finfish Landings by Species, 1955-1962^{1/}

Species	2/1962	1961	1960	1959	1958	1957	1956	1955
	..... (1,000 Metric Tons)							
Alaska pollock	452	353	379	376	284	280	234	231
Anchovy	349	366	349	356	417	430	346	391
Atka mackerel	122	185	115	100	47	105	121	113
Cod	76	67	67	66	60	66	35	39
Croaker	102	115	128	115	106	111	98	103
Flatfish	501	590	509	262	180	159	150	124
Herring	30	97	15	16	38	47	35	46
Mackerel:								
Jack	4/520	510	551	409	282	281	3/	3/
Pacific	408	337	351	294	268	275	266	244
Salmon	123	156	146	179	196	181	150	170
Sand lance	70	108	79	68	98	87	77	58
Sardine	108	127	78	119	136	212	206	211
Saury	483	473	287	522	575	421	327	497
Sea bream:								
Red	10	23	24	26	22	21	21	22
Yellow	10	10	11	16	17	13	11	11
Shark	69	65	69	70	66	76	74	78
Spearfish	5/75	61	55	57	59	53	47	41
Tuna: (Total) ^{6/}	(604)	(562)	(458)	(458)	(414)	(367)	(327)	(279)
Albacore	104	87	89	68	63	77	65	48
Big-eyed	126	113	72	74	72	60	49	42
Bluefin	46	70	65	51	21	34	36	23
Skipjack	170	144	78	166	147	97	97	99
Yellowfin	158	148	154	126	111	99	80	67
Yellowtail	52	53	42	46	43	42	42	46
Other species	815	823	810	744	771	713	933	889
Total	4,979	5,081	4,523	4,079	3,940	3,500	3,593	

1/Principal species only.

2/1962 data obtained from periodical *Suisan Keizai Shimbun*.

3/Data not available.

4/1962 catch includes scad. Other years do not.

5/1962 catch does not include sailfish. Other years do.

6/Includes tuna caught in Pacific, Indian, and Atlantic Oceans, and landed in Japan and in foreign ports. Does not include tuna listed as "meji" (young tuna).

Japan (Contd.):



Fig. 3 - Yellowfin tuna about to be transferred from catcher boat to Japanese tuna mothership.



Fig. 4 - Miyako in Iwate Prefecture is considered Japan's leading mackerel port. Just before the opening of the mackerel season (some time in September), boats assemble at Miyako flying colorful pennants and at 6 a.m. on the opening day sail for the fishing areas.



Fig. 5 - A swordfish being hauled aboard a Japanese catcher boat.



Fig. 6 - Weighing black marlin aboard a Japanese tuna mothership.



Fig. 7 - Transferring bait from live box in Tokyo Bay to fishing vessel in background.



Fig. 8 - A big school of yellowtail driven into a net in Kumano-nada, one of Japan's three largest fishing areas.

Beginning in 1960, the Japanese Government began to liberalize regulations governing the tuna industry. For example, it relaxed restrictions on the construction of newer

Japan (Contd.):

Table 3 - Comparison of 1962 Japanese Finfish Landings with 1955				
Species	1962 Landings in Relation to:			
	1961 Landing		1955 Landing	
	Increase	Decrease	Increase	Decrease
	(Percent)			
Alaska pollock . . .	28	-	96	-
Anchovy	-	5	-	11
Atka mackerel . . .	-	34	8	-
Cod	13	-	95	-
Croaker	-	11	-	1
Flatfish	-	15	304	-
Herring	-	69	-	35
Pacific mackerel . .	21	-	67	-
Salmon	-	1/21	-	1/28
Sand lance	-	35	21	-
Sardine	-	15	-	49
Saury	2	-	-	3
Sea bream	-	39	-	39
Shark	6	-	-	12
Tuna:	7	-	116	-
Albacore	20	-	117	-
Big-eyed	11	-	200	-
Bluefin	-	34	100	-
Skipjack	18	-	72	-
Yellowfin	7	-	136	-
Yellowtail	-	2	13	-

1/Decline in salmon catch result of imposition of catch quota.



Fig. 9 - A large catch of yellowtail unloaded on the beach of a fishing village.

and larger tuna vessels to permit more efficient exploitation of distant tuna fishing grounds; and allowed fishermen engaged in other so-called depressed fisheries (like the salmon and coastal fisheries) to engage in tuna fishing. These measures are believed to be responsible in part for the large increase in tuna landings in 1961 and 1962. The 1961 tuna catch exceeded the 1960 catch by 104,000 metric tons (23 percent) and the 1962 tuna catch exceeded the 1961 catch by 42,000 metric tons (7 percent).

日本

Morocco

FROZEN SARDINE EXPORTS TO FRANCE SUSPENDED AGAIN:

Exports of frozen Moroccan sardines to France in June 1963 encountered the opposi-

tion of French sardine fishermen as occurred previously in July 1962. In sympathy with protests of the French fishermen, dock workers in Lorient and Nantes refused to unload three Moroccan shipments of frozen sardines. Even though one of the vessels was reported to have landed its cargo after a long delay, the new protests resulted in a decision to stop Moroccan sardine exports to France as of July 5, 1963. It had been agreed earlier that imports of Moroccan sardines would be stopped during the July 15-September 15, 1963, period.

This was a hard blow to the fishing and freezing industries in Morocco. The freezing plants have stopped their purchases of fresh sardines and, according to press reports, 3,000 freezing plant workers and 4,500 fishermen are threatened with a lengthy period of unemployment. (United States Embassy, Rabat, June 28, 1963.)



New Zealand

SOVIETS PLAN SURVEY OF FISHERIES RESOURCES ADJACENT TO COAST:

Soviet scientists are planning to study the prospects of commercial fishing in the waters around New Zealand, says an article in Vodny Transport released by the Soviet Legation in Wellington.

The work is part of a Pacific-wide survey being carried out by the Pacific Research Institute of Fisheries and Oceanography under the direction of the assistant head of the institute. (Map on page 100.)

An institute research vessel, the Orlik, is already surveying the resources of the Great Australian Bight, where according to the director of the expedition, the prospects for commercial fishing appear to be good.

New fisheries have already started in the eastern Bering Sea and elsewhere in the North Pacific following investigations by the Institute. (Commercial Fishing, a New Zealand fishery periodical, May 1963.)

SURVEY RAISES HOPE FOR SHRIMP FISHERY:

Establishment of a shrimp fishery in New Zealand is a distinct possibility, but as yet

New Zealand (Contd.):

He explained that although they caught very few shrimp in about 150 to 160 fathoms, from White Island to the Lochland Banks, it did not necessarily mean that there were no shrimp in those areas.

He added that juvenile shrimp of about two inches in length had been caught and he thought that it might not be the right season for them.

"Fishing from White Island to North Cape showed more potential, but this was in water from 200 to 400 fathoms deep," he added.

"This is the only research vessel in New Zealand and we have to cover all the coastal waters for various types of fish. Our research into shrimp fishing has only just started," he continued.

He stated that the depth of the water could be the deciding factor as to whether the shrimp could be commercialized or not, with profit.

Interest in shrimp fishing in the Gisborne district was aroused when a New Zealand fishing firm was granted a license by the Minister of Marine in October 1962 to fish for shrimp and report its findings to the Fisheries Department.

This was the result of shrimp being caught by trawlers from Gisborne in the coastal waters while on routine trips.

The manager of the Gisborne firm investigated methods of shrimp fishing while in Australia in 1962. Some Australian vessels processed, packed, and froze the shrimp while at sea and others used brine tanks to preserve the catch. (*Commercial Fishing*, a New Zealand fishery periodical, May 1963.)



Norway

EXPORTS OF CANNED FISH,
JANUARY 1-APRIL 27, 1963:

Norway's total exports of canned fish January 1-April 27, 1963, were 11.1 percent less than in the same period of 1962. The decline affected all of Norway's principal canned fish products except canned brisling.

Norwegian Exports of Canned Fish, January 1-April 27, 1962-63		
Product	1/1963	1962
	... (Metric Tons) ...	
Brisling	1,822	1,547
Small sild	4,563	4,837
Kipperd herring	1,139	1,884
Soft herring roe	195	285
Sild delicatessen	135	156
Other canned fish	1,084	1,160
Shellfish	475	555
Total	9,413	10,424
1/Preliminary.		

This year, the small sild canning season opened on May 2. The small sild pack during May 2-25, 1963, amounted to 44,854 cases, up 11.6 percent from the pack of 40,187 cases in the same period of 1962.

The brisling packing season began June 4, 1963. The quality of early brisling catches was excellent and a good brisling year was expected. (*Norwegian Cannery Export Journal*, June 1963.)

COD FISHERY TRENDS, MAY 1963:

Norway's 1963 total young cod fishery as of May 25, 1963, was 22,429 metric tons, compared with 18,006 tons at the same time last year. The total of spawning and young cod



Fig. 1 - Shows a Norwegian line-fishing boat boating cod.

landings as of that same date was 78,662 tons, compared with 84,148 tons in 1962. Of this year's total landings, 43,967 tons were sold for drying, 9,819 tons for salting, and 24,876 tons for fresh and frozen (includes 17,609 tons used for fillets).

After the disappointing winter herring and Lofoten cod season, the young cod fishery off Finmark in northern Norway offered Norwe-

Norway (Contd.):



Fig. 2 - A sunny day on the Lofoten Cod fishing grounds.

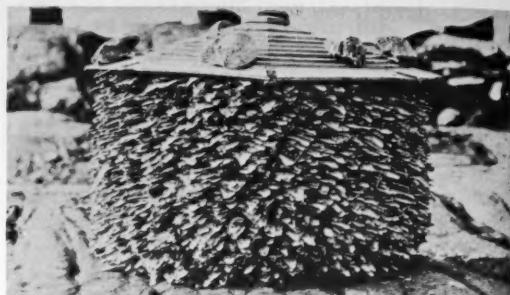
Norwegian Catch and Disposition of Young and Spawning Cod, as of April 27, 1963, with Comparable Data		
Cod	1963	1962
	... (Metric Tons) ...	
Catch as of April 27	64,640	75,693
<u>Disposition of Catch:</u>		
Drying	35,184	28,389
Salting	9,556	20,338
Filleting	12,889	17,114
Icing and fresh	7,011	9,852

gian fishermen some encouragement. Total landings of young cod from the Finmark fishery amounted to 13,149 metric tons as of May 4, 1963, compared with 11,389 tons by the same date one year earlier. But by April 27, the combined 1963 catch of young and spawning cod was still 14.6 percent below that in the comparable period of the previous year. (Fiskets Gang, April 25, May 9 and 30, 1963.)

PROTESTS DISCRIMINATORY TREATMENT BY BRAZIL ON DRY-SALTED COD IMPORTS:

The Norwegian Minister of Commerce informed the Storting on June 12, 1963, that Norway had delivered a protest to the Brazilian Government against alleged preferential treatment of klipfish (dried cod) imports from Denmark.

Norway became a member of the Hague Club in 1958, putting trade and payments with Brazil on a multilateral instead of a bilateral basis, while Denmark has remained outside the Hague Club. The Norwegians allege that the rates of exchange utilized in Brazil discriminate against multilateral trading partners, thus giving the Danish dried cod exports from the Faeroe Islands a price advantage of 15 percent over the traditional Norwegian exports to Brazil, which has long



In Norway, klipfish is carefully stacked between spells of exposure to the sun.

been one of the most important markets for Norwegian cured fish.

The Norwegian Ambassador in Rio de Janeiro delivered an initial protest on January 8 of this year, but since the Brazilians have shown no inclination to correct the situation, the Norwegian Government is now contemplating further action along the following lines:

- (1) Moral suasion--citing the International Monetary Fund's recommendations for the elimination of bilateral payments agreements;
- (2) Negotiations to obtain for Norway advantages similar to those enjoyed by Denmark; and
- (3) An implied threat to curtail coffee imports from Brazil, which now supplies 65-75 percent of Norway's coffee consumption. (United States Embassy, Rio de Janeiro, June 14, 1963.)



Panama

SPINY LOBSTER EXPLORATORY FISHING PROJECT CONTINUED:

M/V "Pelican" Cruise 12 (April 18-May 1) and Cruise 13 (May 14-30, 1963): The one-year survey of stocks of spiny lobsters off Panama by the chartered commercial fishing vessel Pelican was continued during April and May 1963 when operations were switched to the Bocas area in the Caribbean Sea. The survey is being conducted by the U. S. Bureau of Commercial Fisheries through an inter-agency agreement with the U. S. Agency for International Development (AID) Mission to Panama as an Alliance for Progress program. Cruises 12 and 13 were designed to extend exploratory coverage to the Caribbean, as well

Panama (Contd.):

as to obtain some basis for comparing the spiny lobster potential of the Caribbean and Pacific coastal areas of Panama.

Since little evidence of trap fishing was available in the Bocas area off northern Panama, efforts were focused on pure exploration rather than on production-type fishing. The highest catch rates during the Caribbean explorations were achieved during Cruise 13 near the mouth of Bocas del Drago Channel where a 72-trap, 2-day set produced 72 lobsters, all of the species Panulirus argus, except for one specimen of P. guttatus. In contrast to Pacific catches, where males were strongly predominant, Caribbean catches were composed of nearly equal numbers of females and males. Also, although wood traps continued to outfish wire traps, the margin of advantage was markedly lower.

CRUISE 12: A total of 350 lobsters (P. argus) was taken from 589 traps fished in 1- to 3-day sets (1,091 trap days). The 3-day sets were markedly more productive than either 1-day or 2-day sets. Fishing at progressively farther distances from reefs showed that relatively smooth bottom areas from 75 to 200 yards from the reef edges were most productive. Sets made on reefs resulted in only small catches as did sets made at points far removed from the reefs.

Bait trawling yielded small catches of both South American white shrimp (Penaeus schmitti) and sea bobs (Xiphopeneus kroyeri). The best shrimp catch was made between the mouth of Bocas del Drago Channel and the Chanquinola River. It consisted of 10 pounds of white shrimp from a 1-hour tow of a 40-foot trawl. Bait was not as readily available in the Bocas area as it was in the Pacific areas fished on previous cruises.

CRUISE 13: The catch average again was small due to the purely exploratory nature of the investigation. A total of 346 (1,674 trap days) lobsters (P. argus) was taken from 841 traps fished in 2-day sets in the Bocas del Toro Channel area. In the 72-trap set made in the mouth of Bocas del Drago, referred to previously, 43 wood traps caught 54 lobsters in 2 nights while 29 wire traps caught 18 lobsters. Female lobsters averaged 20.5 ounces and males averaged 22.4 ounces. The lobster meat yield averaged 35.2 percent from females and 31.8 percent from males.

Long-line sets solved the bait problem. Seven 3-basket long-line stations yielded 9 sharks--sufficient bait for trap operations throughout the cruise.

Depth-recorder surveys were made of the offshore areas near Isla Colon, Isla Bastimentos, and Cayos Zapatillas to 25 fathoms and in parts of Almirante Bay. The surveys were made to determine reef locations as well as the extent of trawlable bottom that might permit lobster trawling, especially in the event of heavy migratory concentrations. A few isolated trap sets were made off Isla Colon and the southern edge of Cayos Zapatillos with negative results. The depth recorder indications and the limited results of trap explorations indicate that the Bocas del Toro and Bocas del Drago Channel areas have the highest potential for a trap fishery in the area so far explored in the Caribbean Sea off Panama.

Experiments were also conducted during the cruise with a lobster trap made of acrylic plastic. It proved too brittle to withstand rough handling and was removed from service.

M/V "Pelican" Cruise 14 (June 11-26, 1963): During this cruise, the Pelican moved to the Pacific Coast to conduct explorations in the Farallon-San Carlos area of the Gulf of Panama. The catch of 774 lobsters consisted of 321 rock lobsters and 453 spiny lobsters, and they were caught at 150 trap stations (933 traps were set) and 16 trawl drags.

The first week of the cruise was spent working off Farallon where depth-recorder surveys showed the bottom to be primarily smooth mud. Using a 40-foot shrimp trawl, 10 drags of 1 to 1½ hours each, were made in depths of 3 to 10 fathoms. A total of 241 rock lobsters (Scyllarides species) and 62 spiny lobsters (Panulirus gracilis) were caught. Lobster catch rates varied from 1 to 30 per drag for the spiny lobsters and from 2 to 72 for the rock lobsters. Trap fishing yielded poor catches. Only 31 spiny lobsters were taken from 228 traps fished in 2- to 3-night sets at 38 stations. Members of the Farallon Fishery Cooperative came aboard the Pelican each day to observe operations.

During the second week of fishing, the Rio Mar-San Carlos area was explored. A depth-recorder survey showed rock formations scattered throughout the area. The 6 trawl tows attempted in the area in depths of 6 to 14 fathoms produced 9 spiny and 80 rock lobsters.

Panama (Contd.):

Gear damage on the hard bottom precluded further trawling effort. During trap fishing, 112 stations (705 traps set) fishing for 2 to 3 nights produced a total of 351 spiny lobsters. Catch rates at different stations showed wide variations. The best catch consisted of 75 spiny lobsters from a 2-night set of 50 traps in 5 fathoms off Playa la Palma.

The sex ratio for the total lobster catch during the cruise was: spiny lobsters, 246 males/207 females; rock lobsters, 180 males and 141 females. The rock lobster meat yield averaged 45 percent females and 33 percent for males.

Of special interest was the discovery of concentrations of large croakers off Farallon during trawling activities. The concentrations were previously unknown to local fishermen of the area. Five of the ten drags produced fish catches of 1,500 to 3,000 pounds. About 75 percent of the fish catch consisted of marketable species in the 2-pound size range.

Notes: (1) Pelican Cruise 14 concluded the Panamanian lobsters survey project initiated in August 1962 under the interagency agreement between the Bureau of Commercial Fisheries and the USAID Mission to Panama. Due to increasing interest by the fishing industry of Panama in the development of a lobster fishery, a continuation of the Bureau-USAID agreement has been arranged, extending the activities of the Pelican off Panama through June 1964. During the extended survey, the emphasis will be on fishing trials, in cooperation with participating Panamanian fishing companies, to evaluate more closely the lobster potential in selected areas.

(2) See Commercial Fisheries Review, June 1963 p. 85.



Peru

TUNA CANNING FACTORYSHIP PURCHASED FROM A UNITED STATES FIRM BEGINS OPERATIONS:

The former United States tuna canning factoryship Neve, which was purchased from a West Coast firm in the early spring of this year by two Peruvian fishing companies, began operations in the vicinity of Zorritos in northern Peru in mid-1963. After arrival in Peru, the Neve was refitted at Callao. As of mid-June 1963, one tuna purse seiner was reported to be fishing for the Neve and 2 or 3 additional seiners were en route to join the mothership fleet.

The two Peruvian fishing companies that purchased the tuna canning factoryship are

owned by a long established Lima firm. This parent firm has interests in the fish meal and oil industry, plus the new venture in tuna canning, and also a long established hardware business. (United States Embassy, Lima, June 17, 1963.)

REACTION ON SEIZURE OF U. S. TUNA VESSELS BY ECUADOR:

The incident involving the seizure of two United States tuna fishing vessels by Ecuadoran naval vessels engendered only a minimum of interest in the Lima, Peru, press. There were news items in the leading newspapers almost every day since May 26, 1963, but no editorial or other comment. Most of the news stories were from press agencies originating either in Quito or Santiago, or in the United States. The remainder were local recording comments of the Peruvian Minister of Foreign Relations.

Items from Santiago, Chile, related to the determination of Chilean authorities to adopt energetic measures to end "international piracy" by fishing vessels of other nations which invade Chilean territorial waters. There were statements relating to the intention of Chile to initiate joint action with Peru and Ecuador to defend marine resources of the territorial seas claimed by those countries.

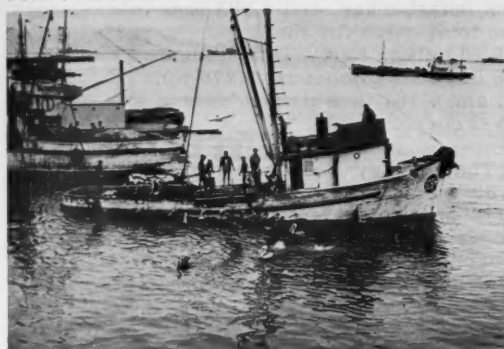
Stories from Quito dealt largely with the seizure of the two United States vessels, the alleged interference of 19 additional United States tuna vessels in their capture, and the refusal of Ecuadoran authorities to release the two vessels while discussions with United States representatives in search of a solution to the problem were being held. A statement of Ecuador's position was published May 30.

The news stories originating in Lima attributed to the Foreign Minister the statement that any measures adopted by Peru to control and supervise the exploitation of marine resources would be in harmony with existing agreements with Chile and Ecuador. This was based on reporters' questions relating to the report from Santiago that Chile intended to propose joint action against foreign fishing fleets. (United States Embassy, Lima, June 6, 1963.)

FISH MEAL SUPPLY AND DISTRIBUTION, 1960-1963:

In 1962, fish meal became Peru's most valuable export, and Peruvian fish meal pro-

Peru (Contd.):



At Chimbote, Peru, anchoveta boat waiting to unload. Anchovies are the raw material for fish meal in Peru.

	1/1963	2/1962	2/1961	1960
	..... (Metric Tons)			
Supply:				
Opening stocks ..	178,552	157,434	46,985	45,882
Production	1,155,000	1,100,000	839,815	528,256
Total supply ..	1,333,552	1,257,434	886,800	574,138
Distribution:				
Exports	3/1,200,000	1,055,882	708,366	507,042
Apparent domestic consumption ...	25,000	23,000	21,000	20,111
Tot. distribution	1,225,000	1,078,882	729,366	527,153
Closing stocks ..	108,552	178,552	157,434	46,985

1/Forecast.
2/Preliminary.
3/Apparent export availability.

duction and exports were expected to rise even higher in 1963. (United States Embassy, Lima, April 15, 1963.)

EXPORTS OF PRINCIPAL MARINE PRODUCTS, JANUARY-MARCH 1962-63:

Item	Jan.-Mar. 1963			Jan.-Mar. 1962		
	Qty.	Value 1/		Qty.	Value 1/	
	Metric Tons	Million Soles	US\$ 1,000	Metric Tons	Million Soles	US\$ 1,000
Fish meal ..	326,393	861.9	32,136	343,430	844.8	31,499
Fish (frozen, canned, etc.)	7,318	48.9	1,823	7,843	55.7	2,077
Fish oil ...	56,887	88.9	3,315	40,796	107.1	3,993
Sperm oil ..	-	-	-	2,463	8.6	321
Whale meal.	1,309	2.9	108	1,954	1.7	63
Fertilizer (guano) ..	760	1.9	71	4,019	10.8	403

1/F.o.b. values converted at rate of 26.82 soles equal US\$1.
(United States Embassy, Lima, July 12, 1963.)



Portugal

CANNED FISH EXPORTS, JANUARY-MARCH 1963:

Portugal's exports of canned fish during the first quarter of 1963 increased 15.2 percent from the same period in 1962, due primarily to higher exports of sardines (up 11.3 percent) and a sharp increase in the exports of mackerel (up 369 percent). Sardines accounted for 78.5 percent of the 1963 exports of canned fish, followed by anchovy fillets with 8.7 percent, and mackerel with 7.9 percent.

Product	Jan.-Mar. 1963		Jan.-Mar. 1962	
	Metric Tons	1,000 Cases	Metric Tons	1,000 Cases
In Oil or Sauce:				
Sardines	13,607	716	12,226	643
Chinchards	331	17	310	16
Mackerel	1,361	54	290	12
Tuna and tuna-like ..	457	15	487	16
Anchovy fillets	1,506	151	1,664	166
Others	70	4	67	3
Total	17,332	957	15,044	856

Portugal's principal canned fish buyers during the first quarter of 1963 were Germany with 2,589 metric tons, followed by Italy with 2,585 tons, United States 2,209 tons, United Kingdom 1,922 tons, and France 1,651 tons. (Conservas de Peixe, May 1963.)

CANNED FISH PACK, JANUARY-MARCH 1963:

Portugal's total pack of canned fish in oil or sauce for the first quarter of 1963 was down about 31 percent as compared with the same period in 1962. The combined sardine and anchovy fillet pack during January-March 1963 accounted for 91.4 percent of the total pack. Compared with the first quarter of 1962, the January-March 1963 pack of sardines dropped 31 percent and the anchovy pack was down about 24.2 percent. During February and March 1963, a closed season for sardine

Product	Jan.-Mar. 1963		Jan.-Mar. 1962	
	Metric Tons	1,000 Cases	Metric Tons	1,000 Cases
In Oil or Sauce:				
Sardines	1,177	62	1,699	89
Chinchards	9	-	27	1
Mackerel	32	1	22	1
Tuna and tuna-like ..	178	6	428	14
Anchovy fillets	1,289	128	1,701	170
Others	13	-	29	1
Total	2,698	197	3,906	276

Portugal (Contd.):

fishing was in effect. The canned tuna pack in the first quarter of 1963 was less than half that of the same period in 1962. (Conservas de Peixe, May 1963.)



South Africa Republic

PILCHARD-MAASBANKER FISHERY,
JANUARY-MARCH 1963:

The fish catch off the Cape west coast of South Africa Republic in the first 3 months of 1963 was 170,298 short tons pilchards, 3,997 tons maasbanker, and 14,233 tons mackerel. The total catch for the 3-months period was 188,538 short tons. This compares with 283,613 tons pilchards, 4,451 tons maasbanker, and 9,207 tons mackerel landed in January-March last year.

The January-March 1963 catch yielded 43,477 short tons of fish meal, 2,786,051 imperial gallons of fish body oil, 4,256,568 pounds of canned pilchards, and 4,949,208 pounds of canned mackerel.

The fish catch off the Cape west coast of the South Africa Republic in the first 2 months

of 1963 was 115,397 short tons pilchards, 273 tons maasbanker, and 4,293 tons mackerel. The total catch for the 2-months period was 119,963 short tons. This compares with 188,838 tons pilchards, 1,276 tons maasbanker, and 6,187 tons mackerel landed in January-February 1962.

The January-February 1963 catch yielded 27,897 short tons of fish meal, 1,636,818 imperial gallons of fish body oil, 2,577,672 pounds of canned pilchards, and 905,280 pounds of canned mackerel. (The South African Shipping News and Fishing Industry Review, May 1963 and April 1963.)



South-West Africa

FISHERIES TRENDS, APRIL 1963:

As of early April this year, all 6 fish reduction and canning plants at Walvis Bay were active for the 1963 season. The quota fixed by the South-West Africa Administration was raised this year from 435,000 tons to 540,000 tons, divided equally among the 6 factories.

In granting this increase in the quotas, the Administration made it clear to the industry that any further quota would be considered in the light of a possible additional license being granted and that factory operators must bear this in mind when expanding or renewing their plant.



A South African canning and industrial products plant showing mooring jetties.

South-West Africa (Contd.):

Because of the ready market for fish meal the industry this year will concentrate on the production of meal, most of which has already been sold in advance.

The labor trouble and bad weather experienced by the Peruvian industry may result in that country falling below its previous high production which could mean an additional demand on South and South-West African supplies in the latter part of the year.

According to the Chairman of the South African Fishmeal Producers' Association, it is expected that Peru will lose about 150,000 tons, or from 15 to 20 percent of her production.

Discussing the future of the fish meal industry, the Chairman said that the growth in demand for this commodity during the period 1960 to 1963 could not be repeated. In the last three years the demand had almost doubled. During the coming years there would only be steady increases which he forecast would be from 5 to 10 percent on average. This meant a consolidation and stabilizing of the market, he added.

The market for fish oil, the Chairman said, had improved. The prospects at present were bright in comparison with the dull outlook at the beginning of 1963. Whale oil production had dropped by 90,000 tons and the anticipated production in Peru would be lower. This, he said, had led to a sharp recovery in the market.

"I am confident that all our 1963 fish oil production will be sold at a much better price than we anticipated," said the Chairman.

The first shipment this year was made on the Anella at the end of April which loaded all the available stock at Walvis Bay. The second shipment from Walvis Bay was made during June. Further shipments will depend entirely on sales.

Sales of canned fish, the Chairman commented, had improved during January-March and were better than the corresponding period last year. Nevertheless, the Far Eastern market was both insecure and uncertain. The canning program of the industry this year will be cut back.

By the middle of April the condition of the pilchards at Walvis Bay was average and the oil yield was from 7 to 8 gallons a ton of fish. Canning on a small scale was started by three of the factories after Easter.

The first substantial shipment of fish meal was made to England. (*The South African Shipping News and Fishing Industry Review*, May 1963.)

SOVIET FLEET RESUMES FISHING OFF COAST:

The Soviet fishing fleet off South-West Africa, estimated at about 20 vessels, was active during April 1963. At one stage no less than 8 ships were anchored just outside the territorial waters about 10 miles north of Walvis Bay. The trawlers transferred catches to the motherships and at the same time a small tanker refueled the vessels.

Two trawlers, the *Yalta* and *Feodosia*, called at Walvis Bay during April for fresh

water and supplies. The *Yalta* was built last year in East Germany.

One of the Soviet trawlers, waiting to transfer its catch, tried catching pilchards. Only once before, in July 1961, did the Russians make any attempt to catch pilchards off the South-West African coast. (*South African Shipping News and Fishing Industry Review*, May 1963.)



Sudan

NEW FISHING HARBOR PLANNED:

The Sudanese have plans to rehabilitate and develop the abandoned Port of Suakin south of Port Sudan on the Red Sea. These plans include the establishment of a fishing harbor and related facilities. The installations are expected to be completed by 1967. (United States Embassy, Khartoum, June 13, 1963.)



Taiwan

FISHERIES TRENDS, FIRST QUARTER 1963:

The yield from Taiwan's fisheries in the first quarter of 1963 was about 7 percent greater than in the same period of the previous year.

Taiwan Fisheries Production, January-March 1963	
	Metric Tons
Offshore and deep-sea fisheries	32,724
Coastal fisheries	34,413
Fish culture	6,100
Total	73,237

Taiwan fisheries production in the first quarter of 1963 did not, however, equal that in the last quarter of 1962, due mainly to a decline in the tuna catch. Taiwan fishermen are concerned over the possibility that their main tuna fishing grounds in the Indian Ocean may be depleted. Because of this, part of the fleet may shift to American Samoa where a new United States cannery was expected to begin operations in mid-1963.

A frost in January 1963 was reported to have killed over 1 million milkfish fingerlings in fish culture wintering ponds. This was expected to reduce the June 1963 harvest by an estimated 20 percent.

In the first quarter of 1963, Taiwan exported over 10 tons of frozen shrimp to Ja-

Taiwan (Contd.):

pan, and exports for the year will probably exceed 50 tons.

Only 4 of the 12 new tuna long-line vessels completed in early 1963 had entered service by March. The others were awaiting installation of refrigeration equipment and processing of crews.

The International Bank for Reconstruction and Development was expected to complete its consideration of the Chinese request for a loan to finance the construction of sixteen 300-ton and two 1,000-ton tuna long-liners some time in May 1963. The proposal had previously been submitted to the International Development Association.



Purse-seine vessels, traveling in pairs, set out from the Tawain port of Nan Fan Ao for fishing in the Pacific Ocean.

The Taiwan Provincial Government Tidal Land Committee has been studying a plan to reopen a 1,200-acre inland sea which has been used for fish culture. The outlet from the inland sea (about 18 miles north of Kaohsiung) has been closed by silt. Failure to reopen the area could cause losses of over US\$1,249,000 a year. (United States Embassy, Taipei, May 22, 1963.)

Notes: (1) Taiwan dollar 40.03 equals US\$1.00.

(2) See *Commercial Fisheries Review*, April 1963 p. 74.



Thailand

FISHING FLEETS ALMOST COMPLETELY MOTORIZED:

Thailand has almost completely motorized its fishing fleet. A Food and Agriculture Organization (FAO) expert reports that the colorful sailing junks that dotted the Gulf of Thailand 10 years ago "have been replaced almost 100 percent by mechanized boats."



Fig. 1 - Thai seiner Sindhu Charnchai (10 gross tons) equipped with a 27-hp. Diesel engine.

With modernization, the annual catch made by Thai fishermen climbed from 205,000 tons in 1953 to 305,000 in 1961 (although part of this increase is attributable to improvements in the collection of statistics).



Fig. 2 - Thai seiner Sapsobhon (32 gross tons) equipped with a 120-hp. Diesel engine.

The importance of progress in the fishing industry can be measured by the fact that fish provides more than 70 percent of the animal protein in the Thai diet. The Thai people prepare fish in a wide variety of forms, adding Indian and Chinese recipes to their favorite local dishes.

The wider ranging, faster, motorized fishing fleets now assure Thailand an abundant supply of fish, chiefly chub mackerel. The new boats have airy quarters which are exemplary for crew accommodation in the tropics.

Thailand (Contd.):

The marked changes are the product of an effective combination of national and international efforts. In addition to FAO programs, the United States and Germany have provided the industry with material and technical aid.

"Thailand has a very alert staff of fisheries officers," the FAO expert stated. "They have been eager to learn and quick to accept training opportunities in Japan and the West."



Fig. 3 - Interior view of the Thai seiner *Sapsobhon*.

Noting that Thai fishermen, with engines of increasing power in their vessels, will tend to range farther out, the FAO expert recommended stronger construction in future boat building so as to make the craft safer during storms. As a result of this and other suggestions by the fishing boat expert, FAO will follow up by sending a Canadian marine architect to assist fishermen when they are building new vessels or modifying existing ones.

The fishing industry is also making progress in the areas of processing and distribution, according to another FAO expert from Pakistan. A technological laboratory has been established to improve handling and preserving fish, he said.

"There are still problems in shipping fish so that it will arrive in good condition in the northern part of the country where there are protein deficiencies in the diet," the Pakistan expert stated. (Food and Agriculture Organization, Rome, Italy, June 21, 1963.)



Uganda

FRESH-WATER FISH PRODUCTION, 1961-62:

Uganda has lakes and rivers totaling 13,600 square miles and commercial fishing is now undertaken in all major waters. Lakes Victoria, Edward, George, Albert, and Kyoga are the main producing areas. The most common methods of fishing are gill-netting, beach-seining, basket-trapping, and long-lining. Tilapia is the most valuable species, but many other kinds of fish find ready sale including Nile perch, catfish, lungfish, elephant-snout fish, and the sardine-sized *Haplochromis*.

A record 63,500 tons of fish with a lakeside value of £2.5 million (US\$7.0 million) and a retail value of £3.5 million (\$9.8 million) were produced in 1962. This compares with 60,188 tons in 1961 with a lakeside value of £2.4 million (\$6.72 million) and retail value of £3.0 million (\$8.4 million). Because of continued difficulties in exporting fish to the Congo, fish exports dropped from about 3.3 million pounds, valued at £210,000 (\$588,000) in 1961, to about 2 million pounds worth £112,000 (\$314,000) in 1962.

Uganda is considered to be more advanced in the mechanization of its fishing fleet than any other country in East or Central Africa with an estimated 1,500 outboard engines now in use. The contrast between Kenyan and Ugandan fishermen is particularly striking. An outboard engine is rarely seen in the Kenya waters of Lake Victoria whereas most fishermen on the Uganda side of the Lake use them regularly. A total of 207 outboard engines were bought by Ugandan fishermen in 1962. (United States Embassy, Kampala, June 1, 1963.)



U.S.S.R.

SOVIET FISHING CONDITIONS:

In the Soviet Union there are two types of ownership of fishing craft and fishing gear. The first type is State ownership, where all vessels, gear, etc., are under fleet administration and the so-called fish combines. The second type is cooperative. Fishery cooperatives not only fish within the territorial limits but they have the same right as the State fleet to fish in international waters.

U. S. S. R. (Contd.):

When the fishing fleets return home, repairs may be made at special repair yards. Very often the vessel's crew is in attendance to keep things in order and aid in routine repairs and preventative maintenance. The fishermen are directly interested in seeing that the vessel is maintained in perfect condition and that all work is carried out in the best possible manner.

Repair work is paid for according to the usual piecework-premium system, and payment is made from the fleet administration's funds. Payment for repair work amounts to 70 percent of the maximum tariff, but if the work has been done well and on time, it increases to 100 percent.

It is obvious that the conditions for the vessel crews cannot be uniform, neither while fishing or in port. For example, crews on the whale catching fleet receive a different pay, all according to whether they are en route to the whaling area, if they are whaling, or if they are on the way home.

Fishermen who fish the northern regions get a special seniority supplement. These fishermen, who work in areas near and around the North Pole, get a basic wage which is higher than the pay offered for comparable work in the Soviet Union's central offshore waters.

The crews eat together. Breakfast, lunch, dinner, and supper are served. On board the vessel one can buy sweets, canned goods, sausages, cheese, fruit, etc. On land there are special shops where the fishermen can make purchases.

All the smaller vessels can request technical assistance and medical aid. At the bases of the fishing fleets there are libraries, bath-houses, movie theaters, barber shops, etc.

On the medium-large and large vessels, as a rule, there are 2- and 4-man staterooms for the members of the crew. On smaller vessels the accommodations often are more crowded.

All fishing vessels are equipped with radio and on many there are motion picture projectors. On the larger vessels there are different kinds of instruction, often of a technical character. When the vessel is fishing, crew

members have the right, now and then, to talk with friends and relatives over the radio. On their fishing cruises the crews also receive regularly, letters, packages, newspapers, and periodicals.

In the Soviet Union fishermen are a highly respected group. Many fishermen have received orders and medals for their prominent contributions, and many have received titles of honor, such as socialist labor hero. (*Vest-kysten*, Danish newspaper, Esbjerg, Denmark, May 3, 1963.)

SAURY CANNING PLANT ESTABLISHED IN KURIL ISLANDS:

A Moscow news broadcast monitored in Japan announced that the Soviet Union has recently started operating a saury canning plant on Shikotan Island, situated northeast of Hokkaido in the Kuril Islands. The plant is said to have an annual production capacity of 10 million cans.

The Soviet Union is exerting great efforts to expand her coastal fishery processing facilities. Her 1963 investments for construction of refrigeration and fish processing plants represent a 42-percent increase over 1962 investments. (*Suisan Tsushin*, June 3, 1963.)



United Kingdom

SMALL-TYPE STERN TRAWLERS HAVE MANY NEW FEATURES:

In Great Britain there is a new surge of interest in 80- to 100-foot long stern trawlers for North Sea fishing. These vessels, embodying distinct attempts at automation, were one of the features at the Second World Fishing Congress held in London, May 27-31, 1963.

The first contribution to this type vessel comes from a large British fishing company with their *Daring* class, the first two of which, now under construction, may well set the pattern in near-water fishing vessels for years to come.

The first of these new type stern trawlers is the *Ross Daring* which is scheduled to enter service in October 1963, to be followed after a few months by a second vessel of the same class, the *Ross Delight*. Of combined welded-

United Kingdom (Contd.):



Fig. 1 - Daughter of Ross Group's chairman names vessel Ross Daring on May 25, 1963.

riveted construction, and incorporating the latest techniques in unit assembly, the vessel has a flush deck amidships, single-tier deck-house, and a clipper-type bar stern. The principal characteristics of the Ross Daring are:

Length over-all 99'0"; length between perpendiculars 85'0"; molded beam 23'0"; molded depth 12'6"; draft aft 11.0"; draft forward 8'6". Propulsion is by an 8-cylinder type, 4-stroke Diesel engine. Pressure-charged and intercooled it develops 407 s. hp. at 1,200 r.p.m. (at a propeller speed of 300 r.p.m.). Power transmission machinery consists of an ICRVP size 3 gearbox and hydraulic unit giving a 4:1 reduction, and a variable pitch propeller (diameter 6'5 $\frac{1}{4}$ "). Designed speed is 10 $\frac{1}{2}$ knots. Main electric power is supplied by a 20 kw. generator, belt-driven from the main engine. Power for the hydraulic operation of the main winches is provided by a 6-cylinder type Diesel having a maximum output of 87 b. hp. at 1,800 r.p.m.



Fig. 2 - Launching of the Ross Daring at Cochrane's Selby Shipyard on May 25, 1963.

All winches are hydraulically-operated and specially developed. Hauling gear consists of twin "split" winches mounted on each side of the fish deck and remotely-controlled from the bridge. Each drum has an approximate capacity of 400 fathoms of 2 $\frac{3}{8}$ " cir. warp and has automatic guiding-on gear. A twin-drum hydraulic warping winch, mounted on the center line of the upper deck and aft of the fore-castle, is fitted with controls at the winch. The entire engine and pump unit is mounted on a bedplate which also serves as a supply tank for the hydraulic system.

Aimed at making work pleasant for the fishermen, the new stern trawlers include:

- (1) An entirely redesigned deck layout which allows the whole of the framework of the trawl to be taken on board with only one set of links to disconnect.
- (2) Facilities to enable all the catch to be gutted and washed under cover at waist level, thereby relieving fishermen of the stooping and stretching which has been their experience since trawling began.
- (3) A 4,800-cubic-foot fish hold, giving the crew of 4 men ample room for working, and for stowing the fish quickly and efficiently.

Economy in operation, in fact, is the yardstick guiding all aspects of design. Having decided the maximum crew requirements (number, accommodation, etc.) and the feasibility of remote control from the bridge of both winch and sealed engine, it was found that the latest in fishing equipment, ample deck space, and a roomy fish hold could be built into a small vessel requiring far smaller crew than formerly appeared possible.

United Kingdom (Contd.):

Difficulties are anticipated in the initial stages until the crews are familiar with the different skills required. But fishermen are known to be quite adaptable and the basic reasoning behind the new design is expected to prove itself within a very short time.

NEW FISH-DRYING PROCESS DEVELOPED:

A new process for the accelerated mechanical drying of fish has been developed by a Scottish shipbuilding firm in association with the British Government Torry Research Station of the Department of Scientific and Industrial Research at Aberdeen.

The new method will enable fish to be treated under strict hygienic control within hours of being caught. It will prevent the possibility of infestation and retain the protein value of the fish.

This development, it is claimed, will enable countries which have no refrigerated distribution and storage facilities, and which depend on locally-caught fish or naturally dried fish, to be supplied with high protein fish at economic prices. (Fish Trades Gazette, June 8, 1963.)

FISHERY LOANS INTEREST RATES REVISED:

The British White Fish Authority announced that beginning April 27, 1963, their rates of interest on loans for fishing vessels of not more than 140 feet, new engines, nets and gear, would be as follows: on loans for not more than 5 years, $5\frac{1}{4}$ percent (decrease $\frac{1}{8}$ percent); on loans for more than 5 years, but not more than 10 years, $5\frac{1}{2}$ percent (decrease $\frac{1}{8}$ percent); on loans for more than 10 years, but not more than 15 years, 6 percent (decrease $\frac{1}{8}$ percent); and on loans for more than 15 years, but not more than 20 years, $5\frac{7}{8}$ percent (decrease $\frac{1}{4}$ percent).

The rates on loans made before April 27 are unchanged.

In June, the White Fish Authority announced, the following additional changes in rates of interest on loans made as from June 8:

Fishing vessels of not more than 140 feet, new engines, nets and gear: on loans for

more than 5 years, but not more than 10 years, $5\frac{3}{8}$ percent (decrease $\frac{1}{8}$ percent); on loans for more than 10 years, but not more than 15 years, $5\frac{3}{4}$ percent (decrease $\frac{1}{4}$ percent); on loans for more than 15 years, but not more than 20 years, $5\frac{3}{4}$ percent (decrease $\frac{1}{8}$ percent).

All other rates were unchanged. (Fish Trades Gazette, May 11 and June 22, 1963.)

Note: See Commercial Fisheries Review, February 1963 p. 89.

**Foreign Fisheries Briefs**SOVIET FISHING IN NORTH PACIFIC AND BERING

SEA: In April-July 1963, a total of 180 to 200 Soviet fishing vessels were operating in the Bering Sea and North Pacific Ocean, including the Gulf of Alaska. Of those, about 130 to 140 craft trawled for ocean perch in the Gulf of Alaska. In mid-July, however, two king crab factoryships and their accompanying fishing vessels moved from the Bering Sea into the Gulf of Alaska to a location about 30 miles south of Kodiak Island. This is the first time the Soviets have entered the commercial fishery for king crab south of the Alaska Peninsula. Later in mid-July the Soviet king crab fleets had departed from the area south of Kodiak Island. (Unpublished sources.)

SOVIET FISHING ON GEORGES BANK: During June the Soviet fleet on Georges Bank varied from about 150 to 200 vessels. So far this year 30 or more trawlers have been sighted traveling between the Northwest Atlantic and ports in Cuba. (Unpublished sources.)

SOVIET TRAWLER OFF CALIFORNIA COAST: A 150-foot Soviet trawler was reported off the coast of northern California on June 15, 1963, at a point about 100 miles west of Eureka. The vessel's gear was described as "similar to that used for fishing shrimp." (Unpublished sources.)

SOVIET-CUBAN SCIENTIFIC AGREEMENT: Soviet and Cuban scientists signed a scientific cooperation agreement May 28 providing for joint studies in a number of fields including oceanography. One project provides for a series of joint studies of the ocean near Cuba. (Unpublished sources.)

JAPANESE WILL BUILD SOVIET FISHING VESSELS: The Soviet Union ordered 20 fishing vessels from Japanese shipyards for a total of US\$137 million. The Soviets requested the following credit terms: 30 percent down and the rest in 12 semiannual payments of 5 percent of the total price. The Japanese Government accepted the Soviet terms except that the semiannual payments are to be paid in 5-1/2 rather than 6 years, the last payment being the final 10 percent. The following vessels were ordered: 5 tuna factoryships (US\$20 million) $\frac{1}{2}$; 5 floating canneries (US\$40 million); 5 fish-meal factoryships (US\$37 million); and 5 refrigerated fish carriers (US\$40 million). (La Pêche Maritime, May 1963.)

FRENCH WILL BUILD SOVIET STERN TRAWLERS: The Soviet Government has concluded a 100-million-franc (about US\$20 million) contract with a private French shipyard for 3 factory stern trawlers. The vessels will be about 425 feet long and 63 feet wide each with a crew of 220 persons, 160 of which will be processing workers. They will trawl and purse seine principally for herring and for tropical sardines. The most modern automated processing equipment will include canning, freezing, and fish-reduction facilities. Conveyors will carry empty cans

Foreign Fisheries Briefs (Contd.):

and cartons to the processing areas and finished products to the storage holds. Each vessel will be equipped with closed circuit television. The first of these 4,250-gross-ton vessels will be delivered in 1964. La Peche Maritime, May 1963.)

LIBERIAN FISHING INDUSTRY TO BE REORGANIZED:
A new Bureau of Commercial Fisheries is to be set up in

the Liberian Department of Agriculture and Commerce to regulate the fishing industry by centralizing the landing and marketing of fish. It will control the distribution and prices of fish, and will collect statistics. To implement this program, the Government of Liberia has requested the Technical Assistance Board of the United Nations to assign a fisheries expert to that country. (U. S. Embassy, Monrovia, June 9, 1963.)

^{1/}Reports in Japanese periodicals on the building of tuna motherhips for U. S. S. R. as reported in Commercial Fisheries Review, July 1963 p. 86, were somewhat different as to detail.

Note: These briefs were abstracted and compiled by the U. S. Bureau of Commercial Fisheries Branch of Foreign Fisheries and Trade.



UNITED STATES FOOD SUPPLY IS BOTH SAFE AND NUTRITIOUS

The American food supply is both safe and nutritious, according to results of "total diet studies" completed by the U. S. Food and Drug Administration (FDA) in November 1962. FDA scientists analyzed market basket samples of foods for pesticide residues and vitamin content.

Pesticide residue content was found well within safe tolerance limits set for specific pesticides on individual foods.

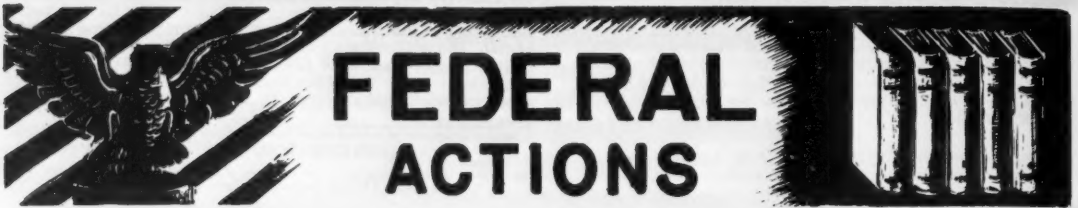
Levels of Vitamin A, thiamin, riboflavin, and niacin were found to be more than two times the Recommended Dietary Allowances of the Food and Nutrition Board of the National Research Council. Vitamins B₆ and B₁₂ were well above the amounts estimated as required for good nutrition. (Recommended allowances for B₆ and B₁₂ have not been established.) The studies did not include vitamins C and D because the method of sample preparation results in destruction of those vitamins. But FDA nutritionists point out that other studies have shown that those vitamins are adequately supplied by food sources.

The samples analyzed represented the total diet of a 19-year-old boy--the biggest eater in the United States population. "Market basket" samples consisting of about 60 pounds of groceries--a one week's supply--were obtained every three months from chain groceries in the Washington, D. C., area beginning in May 1961. Beginning in May 1962, similar samples were collected also in Atlanta, Minneapolis, St. Louis, and San Francisco.

Commodities and quantities sampled were from the "moderate income" food list furnished by Household Economics Research Division of the Department of Agriculture. The Clinic Kitchen at the National Institutes of Health assisted in preparation of foods normally cooked before consumption.

Determinations were made for residues of 20 chlorinated hydrocarbons, including DDT, and for organic phosphate type insecticides. Most of the samples contained no residues or mere traces of chlorinated hydrocarbons; a few contained amounts measurable by extremely sensitive techniques. Only a few traces of organic phosphate residues were found. FDA scientists interpret the findings as an assurance of confidence in the protection provided by the Pesticides Amendment of the Federal Food, Drug, and Cosmetic Act.

The survey findings also support the conclusion that foods readily available at supermarkets contain ample quantities of vitamins. They contradict the allegations of food faddists that the American food supply is nutritionally depleted.



Department of Commerce

AREA REDEVELOPMENT ADMINISTRATION

INDUSTRIAL LOAN TO ALASKA CANNING FIRM APPROVED:

An industrial loan of \$148,367 to the Aleutian Development Company, Inc., Unalaska, Alaska, was approved by the Area Redevelopment Administration (ARA), on June 13, 1963. The money will be used to replace and modernize canning plant equipment and to expand salmon and crab canning operations at Jamal, Alaska. In addition, the ARA loan will allow the Alaska firm to buy two fishing vessels and gear to be used in the king crab fishery in the area.

About 25 native cannery workers are expected to have longer periods of employment as a result of the plant expansion. New jobs will also be created by the new fishing vessels.



Department of Health, Education, and Welfare

FOOD AND DRUG ADMINISTRATION

EFFECTIVE DATE OF STANDARDS OF IDENTITY FOR FROZEN RAW BREADED SHRIMP STAYED:

The effective date of July 6, 1963, of the standards of identity for frozen raw breaded shrimp and frozen raw lightly breaded shrimp has been stayed by an order of the U. S. Food and Drug Administration published in the Federal Register, July 6, 1963.

Objections were filed to the original order (Federal Register, May 7, 1963), establishing definitions and standards of identity. There-

fore, hearings on the objections will be scheduled and announced in the Federal Register.

Note: See Commercial Fisheries Review, June 1963 page 94.

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STUDY OF STATE AND LOCAL FOOD AND DRUG LAWS:

Plans for a comprehensive study of State and local food and drug laws and their enforcement were announced on July 1, 1963, by the U. S. Food and Drug Administration. The Federal Agency has contracted with Public Administration Service, a nonprofit organization in Chicago, Ill., to carry out the project. The study has the following basic objectives:

1. To identify what the State and local governments are providing consumers in terms of food and drug protection.
2. To identify and analyze similarities, variations, inconsistencies, and duplications affecting the State and local laws and the operations of their enforcement agencies.
3. To identify areas which could be improved by better State and local laws, organization, personnel, facilities, programs, policies, budgets, and Federal programs, or by improved coordination between Federal, State, and local programs, and to provide recommendations to accomplish improvements in each identified area.
4. To provide goals, guidelines as to means of approach, and timetables to attain any improvements and modifications deemed necessary.

The study will cover a period of 18 months at a cost to the Government of \$250,000.

The Commissioner of the U. S. Food and Drug Administration said, "The performance

of the study will be in accordance with the prospectus developed by the Government with the assistance of a committee representing the Association of Food and Drug Officials of the United States. This independent study by an organization outside of Government should bring to light any needed improvement in laws, organization, and support for Federal-State coordination."



Department of the Interior

OFFICE OF THE SECRETARY

COMMISSIONER OF FISH AND WILDLIFE AUTHORIZED TO ENFORCE INDIAN COMMERCIAL FISHING REGULATIONS IN ALASKA:

Notice of Secretarial Order No. 2857, Amendment No. 1, was published in the Federal Register of July 12, 1963, as follows:

Office of the Secretary

[Order No. 2857, Amdt. No. 1]

COMMISSIONER OF FISH AND WILDLIFE

Delegation of Authority To Enforce Regulations Governing Indian Fish- ing in Alaska

Secretarial Order No. 2857, dated June 6, 1961, is amended to read:

SECTION 1. Delegation. The Commissioner of Fish and Wildlife is authorized to enforce the regulations of the Department of the Interior governing Indian fishing in Alaska as set forth in 25 CFR Part 88, in those areas of the State of Alaska in which he is requested to do so by the Commissioner of Indian Affairs.

SEC. 2. Redelegation. The Commissioner of Fish and Wildlife may, in writing, redelegate or authorize written re-delegation of the authority granted in section 1 of this Order, except that authority set forth in 25 CFR Part 88, § 88.6(e). The redelegation of this authority shall be published in the FEDERAL REGISTER.

JAMES K. CARR,

Acting Secretary of the Interior.

JULY 9, 1963.

Note: As authorized above, the redelegation of authority to the Director, Bureau of Commercial Fisheries, and the redelegation of authority to the Regional Director, Region 5 of the Bureau of Commercial Fisheries, to enforce the above regulations (25 CFR Part 88) were published in the Federal Register of July 16, 1963.

BUREAU OF COMMERCIAL FISHERIES

PUBLIC MEETINGS ON PROPOSED REVISION OF GRADE STANDARDS FOR FROZEN RAW BREADED SHRIMP:

The proposed revision of the United States Voluntary Standards of Grade for Frozen Raw

Breaded Shrimp was discussed at public meetings held by the U. S. Bureau of Commercial Fisheries.

All interested parties were invited to attend the public hearings and comment on the proposed revision. The meetings were held on July 8, 1963, at Brunswick, Ga.; July 10 at Tampa, Fla.; July 12 at Brownsville, Tex.; July 15 at Los Angeles, Calif.; and July 17 at Chicago, Ill.

All comments, written or verbal were carefully considered in preparing the final draft of the revision, prior to publication in the Federal Register.

BUREAU OF SPORT FISHERIES AND WILDLIFE

ALASKA REGIONAL OFFICE CLOSED IN REORGANIZATION:

Phasing out of Juneau, Alaska, as a regional office of the Bureau of Sport Fisheries and Wildlife, and transfer of its administration function to Bureau offices in Portland, Oreg., was started July 1, 1963.

The transfer will result in economy, closer cooperation, and more efficient operation, since many of the activities which were formerly the responsibility of the Bureau have been assumed by the State of Alaska.

After the reorganization is completed, the Bureau of Sport Fisheries and Wildlife will be represented in Alaska by an official who will remain in Juneau.

BUREAU OF INDIAN AFFAIRS

INDIAN COMMERCIAL FISHING REGULATIONS IN ALASKA:

An amendment to Part 88 of Title 25, Code of Federal Regulations, became effective on publication in the Federal Register, July 12, 1963. The purpose of the amendment was to govern Indian commercial fishing in Alaska.

Notice of the amendment as proposed appeared in the Federal Register of April 30, 1963. Within 30 days after publication of the notice, interested persons submitted written comments that the purpose of the regulations should be broadened to regulate all fishing within the Annette Islands Reserve. The comments were considered, and, where appropriate, incorporated into the amendment set forth below:

Title 25—INDIANS

Chapter I—Bureau of Indian Affairs, Department of the Interior

SUBCHAPTER H—ECONOMIC ENTERPRISES

PART 88—INDIAN FISHING IN ALASKA

Sec.

88.1 Purpose.

88.2 Annette Islands Reserve; definition; exclusive fishery; licenses.

88.3 Commercial fishing, Annette Islands Reserve.

88.4 Subsistence and sport fishing, Annette Islands Reserve.

88.5 Commercial fishing, Karluk Indian Reservation.

88.6 Enforcement; violation of regulations; corrective action; penalties; closure of restriction, Annette Islands Reserve.

§ 88.1 Purpose.

The purpose of the regulations in this part is to regulate all fishing within the Annette Islands Reserve and to regulate Indian and other native commercial fishing in the Karluk Indian Reservation, but they shall not be construed to limit any rights of Indians or other natives of Alaska not specifically covered hereby.

§ 88.2 Annette Islands Reserve; definition; exclusive fishery; licenses.

(a) *Definition.* The Annette Islands Reserve is defined as the Annette Islands in Alaska, as set apart as a reservation by section 15 of the Act of March 3, 1891 (26 Stat. 1101, 48 U.S.C. sec. 358), and including the area identified in the Presidential Proclamation of April 28, 1916 (39 Stat. 1777), as the waters within three thousand feet from the shore lines at mean low tide of Annette Island, Ham Island, Walker Island, Lewis Island, Spire Island, Hemlock Island, and adjacent rocks and islets, located within the broken line upon the diagram attached to and made a part of said Proclamation; and also the bays of said islands, rocks, and islets.

(b) *Exclusive fishery.* The Annette Islands Reserve is declared to be exclusively reserved for fishing by the members of the Metlakatla Indian Community and such other Alaskan natives as have joined or may join them in residence on the aforementioned islands, and any other person fishing therein without authority or permission of the Metlakatla Indian Community shall be subject to prosecution under the provisions of section 2 of the Act of July 2, 1960 (74 Stat. 469, 18 U.S.C. sec. 1165).

(c) *Licenses.* Members of the Metlakatla Indian Community, and such other Alaskan natives as have joined them or may join them in residence on the aforementioned islands, shall not be required to obtain a license or permit from the State of Alaska to engage in fishing in the waters of the Annette Islands Reserve.

§ 88.3 Commercial fishing, Annette Islands Reserve.

(a) *Definition.* Commercial fishing is the taking, fishing for, or possession of fish, shellfish, or other fishery resources with the intent of disposing of such fish, shellfish or other fishery resources or parts thereof for profit, or by sale, barter, trade, or in commercial channels.

(b) *Trap fishing sites; number and location.* During 1963, and until the

Secretary of the Interior or his duly authorized representative determines otherwise, the Metlakatla Indian Community is permitted to operate not more than one trap per site for salmon fishing at any four of the following sites in the Annette Islands Reserve, Alaska:

(1) Annette Island at 55°15'09" north latitude, 131°36'00" west longitude.

(2) Annette Island at 55°12'52" north latitude, 131°36'10" west longitude.

(3) Annette Island at 55°02'47" north latitude, 131°38'53" west longitude.

(4) Annette Island at 55°05'41" north latitude, 131°38'39" west longitude.

(5) Annette Island at 55°01'54" north latitude, 131°38'36" west longitude.

(6) Annette Island at 55°00'45" north latitude, 131°33'30" west longitude.

(7) Annette Island at 54°59'41" north latitude, 131°36'48" west longitude.

(8) Ham Island at 55°10'13" north latitude, 131°19'31" west longitude.

(c) *Trap fishing season.* Fishing for salmon with traps operated by the Metlakatla Indian Community is permitted only at such times as commercial salmon fishing with purse seine, is permitted by order or regulation of the Alaska Board of Fish and Game for Commercial Fishing in any part of Fishing District No. 1: *Provided*, That in any event, fishing for salmon with traps operated by the Metlakatla Indian Community is permitted for not less than one week beyond the last closing date established either by order or regulation of the Alaska Board of Fish and Game for commercial salmon fishing with purse seines in that portion of Fishing District No. 1 which lies east of 131 degrees 12 minutes west longitude.

(d) *Size, construction and closure of fish traps.*—(1) *Size.* When any part of a trap is in a greater depth of water than 100 feet, the trap as measured from shore at mean high tide to the outer face of the pot shall not extend beyond 900 feet.

(2) *Construction.* Poles shall be permanently secured to the webbing at each side of the mouth of the pot tunnel and shall extend from the tunnel floor to a height at least four feet above the water. A draw line shall be reeved through the lower end of both poles and the upper end of one.

(3) *Method of closing.* The tunnel walls shall be overlapped as far as possible across the pot gap and the draw line shall be pulled tight and both secured so as to completely close the tunnel. In addition, 25 feet of the webbing of the heart on each side next to the pot shall be lifted or lowered in such manner as to permit the free passage of fish.

(e) *Other forms of commercial fishing.* All commercial fishing, other than salmon fishing with traps, shall be in accordance with the season and gear restrictions established by rule or regulation for Fishing District No. 1E by the Alaska Board of Fish and Game for Commercial Fishing except that the season for purse seine fishing for salmon shall be the same as provided in paragraph (c) of this section.

§ 88.4 Subsistence and sport fishing, Annette Islands Reserve.

(a) *Definitions.* (1) Subsistence fishing is the taking or attempting to take any species of fish or shellfish for purposes other than sale or barter, except

as provided for in subparagraph (2) of this paragraph.

(2) Sport fishing is the taking or attempting to take for personal use, and not for sale or barter, any fresh water, marine, or anadromous fish by hook and line or by such means as defined by regulation or statute of the State of Alaska.

(b) *Restrictions.* Subsistence fishing within the Annette Islands Reserve shall be in accordance with the season, gear and bag restrictions established by rule or regulation of the Alaska Board of Fish and Game for Commercial Fishing in Fishing District No. 1. Sport fishing within the Annette Islands Reserve shall be in accordance with the season, gear and bag restrictions established by rule or regulation for Southeastern Alaska by the Alaska Board of Fish and Game. Both subsistence and sport fishing shall also be in accordance with such ordinances as may be adopted by the Council of the Metlakatla Indian Community and approved by the Secretary of the Interior.

§ 88.5 Commercial fishing, Karluk Indian Reservation.

(a) *Definition.* The Karluk Indian Reservation includes all waters extending 3,000 feet from the shore at mean low tide on Kodiak Island beginning at the end of a point of land on the shore of Shelikof Strait about 1¼ miles east of Rocky Point and in approximate latitude 57°39'40" N., longitude 154°12'20" W.; thence south approximately 8 miles to latitude 57°32'30" N.; thence west approximately 12½ miles to the confluence of the north shore of Sturgeon River with the east shore of Shelikof Strait; thence northeasterly following the easterly shore of Shelikof Strait to the place of beginning, containing approximately 35,200 acres.

(b) *Who may fish; licenses.* The waters of the Karluk Indian Reservation shall be open to commercial fishing by bona fide native inhabitants of the native village of Karluk and vicinity, and to other persons insofar as the fishing activities of the latter do not restrict or interfere with fishing by such natives. Such natives shall not be required to obtain a license to engage in commercial fishing in the waters of the Karluk Indian Reservation.

(c) *Salmon fishing; restrictions.* Commercial fishing for salmon by native inhabitants of the native village of Karluk and vicinity in the waters of the Karluk Indian Reservation shall be in accordance with the seasonal and gear restrictions of the rules and regulations of the Alaska Board of Fish and Game for Commercial Fishing in the fishing district embracing the Karluk Indian Reservation except that: (1) Beach seines up to 250 fathoms in length may be used northeast of Cape Karluk; and (2) prior to July 1, fishing shall be permitted to within 100 yards of the Karluk River where it breaks through the Karluk Spit into Shelikof Strait.

§ 88.6 Enforcement; violation of regulations; corrective action; penalties; closure of restrictions, Annette Islands Reserve.

(a) *Enforcement.* The regulations in this part shall be enforced by any duly authorized representative of the Secretary of the Interior. Any fish trap, vessel, gear, processing establishment or

other operation or equipment subject to the regulations of this part shall be available for inspection at all times by such representative.

(b) *Violation of regulations.* Whenever any duly authorized enforcement representative of the Secretary of the Interior has reasonable cause to believe any violation of the regulations of this part relating to fish traps has occurred, he shall direct immediate closure of the trap involved and shall affix an appropriate seal thereto to prevent further fishing. The matter shall be reported without delay to the Area Director, Bureau of Indian Affairs, who shall thereupon report and recommend to the Secretary of the Interior appropriate corrective action.

(c) *Corrective action.* Any violation of the regulations of this part relating

to fish traps shall be ground for the temporary or permanent closure, as the Secretary of the Interior may determine, of any or all traps authorized by § 88.3(a), or the withdrawal and rescission of the right to fish for salmon with traps at any or all sites authorized thereby.

(d) *Penalties.* Any person who violates any of the regulations of this part shall be subject to prosecution under section 2 of the Act of July 12, 1960 (74 Stat. 469, 18 U.S.C. sec. 1165), which provides as follows:

"Whoever, without lawful authority or permission, willfully and knowingly goes upon any land that belongs to any Indian or Indian tribe, band, or group and either are held by the United States in trust or are subject to a restriction against alienation imposed by the United States, or upon any lands of the United States that are reserved for Indian use, for the purpose of hunting,

trapping, or fishing thereon, or for the removal of game, peltries, or fish therefrom, shall be fined not more than \$200 or imprisoned not more than ninety days, or both, and all game, fish, and peltries in his possession shall be forfeited.

(e) *Closure or restriction, Annette Islands Reserve.* The Commissioner of Fish and Wildlife, after consultation with officials of the Metlakatla Indian Community, is authorized and directed, upon a determination of its necessity to promote sound conservation practices, to restrict or close to commercial, subsistence or sport fishing any portion of the Annette Islands Reserve by notice given appropriate local publicity.

JAMES K. CARR,
Acting Secretary of the Interior.

JULY 9, 1963.

Note: See Commercial Fisheries Review, June 1963 p. 96.



Department of Labor

WAGE AND HOUR AND PUBLIC CONTRACTS DIVISIONS

MINIMUM WAGE RATES FOR PUERTO RICO TUNA CANNERY WORKERS REVISED:

A revised schedule of new minimum wage rates which reflect the 10-percent automatic

increase prescribed by the 1961 amendments to the Fair Labor Standards Act for industries (including tuna canning) in Puerto Rico and the Virgin Islands was announced on June 8, 1963, by the U. S. Labor Department's Wage and Hour and Public Con-

tracts Divisions. The revision amends a prior schedule announced on March 23, 1963, by showing minimum wage rates put into effect in certain industries since that date. The new minimum wage rate of \$1.25 per hour for the tuna canning industry as announced on March 23, will become effective on November 3, 1963. The current minimum wage for tuna cannery workers in Puerto Rico is \$1.15 per hour.

The new rates reflecting the automatic increase, which will become effective for most industries on November 3, 1963, amount to a 25-percent increase over the rates which were in effect prior to the 1961 amendments to the Fair Labor Standards Act. This increase applies only to rates for those workers covered on the basis of the Act's provisions prior to the amendments. It does not affect workers covered for the first time by reason of the amendments.



The amendments also provided, as in the case of the previous 15-percent statutory increase, that employers in Puerto Rico or the Virgin Islands can apply to the Secretary of Labor for appointment of a review committee to recommend minimum wage rates to be paid in lieu of the rates resulting from the 10-percent statutory increase. The review committee recommendations on revision of the wage order program for Puerto Rico were published in the Federal Register on June 8, 1963.

Note: See Commercial Fisheries Review, May 1963 page 91, February 1963 page 94, October 1961 page 86.



Eighty-Eighth Congress (First Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.



ANTIDUMPING ACT AMENDMENT: H. R. 7330 (Wharton) June 27, 1963; H. R. 7395 (Ashley), H. R. 7398 (Dulski), H. R. 7410 (Cunningham), and H. R. 7411 (Fuqua) July 8, 1963; H. R. 7432 (Battin), H. R. 7450 (Siler), and H. R. 7456 (Harvey) July 9, 1963; H. R. 7492 (Ashbrook) and H. R. 7517 (Fulton) July 11, 1963; H. R. 7545 (Mosher) and H. R. 7548 (Saylor) July 15, 1963; H. R. 7614 (Clark) July 16, 1963; introduced in House, to amend the Antidumping Act, 1921; referred to Committee on Ways and Means. Similar or identical to other bills previously introduced in House.

CALIFORNIA MARINE BIOLOGICAL LABORATORY: S. 1805 (Engle & Kuchel) introduced in Senate June 27, 1963, relating to the use by the Secretary of the Interior of land at La Jolla, California, donated by the University of California for a marine biological research laboratory, and for other purposes; referred to the Committee on Interior and Insular Affairs.

CANADIAN TERRITORIAL WATERS EXTENSION: Representative Pelly (Wash.) had printed in the Congressional Record (June 28, 1963, Appendix, page A4148), an article he wrote that appeared in the June 23, 1963, issue of the Seattle Times on the proposal of the Canadian Government on the extension of the Canadian territorial waters to 12 miles.

COLLISION AT SEA, REGULATIONS FOR PREVENTION: H. Rept. 365, Authorizing the President to Proclaim Regulations for Preventing Collisions at Sea (June 6, 1963, report from the Committee on Merchant Marine and Fisheries, House of Representatives, 88th Congress, 1st Session, to accompany H. R. 6012), 38 pp., printed. The Committee favorably reported the bill with amendments and recommended passage. The amendments to the bill are technical in order to conform to the printed copy to the original draft. Contains the need for the legislation, purpose of the bill, departmental reports, and changes in existing law.

The Subcommittee on Merchant Marine and Fisheries of the Senate Committee on Commerce on June 27, 1963, held hearings on S. 1459.

The House on July 8, 1963, passed with amendments H. R. 6012, to authorize the President to proclaim regulations for preventing collisions at sea. Would authorize the President, on behalf of the United States, to proclaim the international regulations for preventing collisions at sea, 1960, on or after a date fixed by the Intergovernmental Maritime Consultative Organization for application of such regulations by governments which have agreed to accept them. Such regulations shall thereafter have effect as if enacted by statute, and be followed by all public and private vessels of the United States and by all aircraft of United States registry. However, they shall not apply to inland waters or any territorial waters of the United States. Would repeal the existing international rules for preventing collisions at sea, 1948. Regulations were formulated at the Fourth International Conference on Safety of Life at Sea, 1960 (annex E to the final act of the International Conference on Safety of Life at Sea). Parts of the rules of the International Regulations for preventing collisions at sea were rewritten. Those applying directly to fishing vessels are covered under Rules 9 and 13. Senate received the bill July 10, 1963; referred to Committee on Commerce.

COMMERCIAL FISHERIES FUND: The Senate on June 27, 1963, received a favorable report (S. Rept. 338) from the Committee on Commerce on S. 627, to

promote State commercial fishery research and development projects, and for other purposes.

S. Rept. 338, State Commercial Fisheries Development (A report from the Committee on Commerce, U. S. Senate, 88th Congress, 1st Session, to accompany S. 627), 19 pp., printed. The Committee reported the bill favorably with amendments and recommended that the bill be passed. The Committee amendments provide for an "interstate cooperative fund" for a period of five years, which would be available to the States in amounts determined by the Secretary of the Interior providing that "the Secretary shall give a preference to those States in which he determines there is a commercial fishery failure due to a resource disaster arising from natural causes and in which a new commercial fishery can be developed where none existed previously." This discretionary fund, which would have annual appropriations of \$500,000 in the first two years and \$750,000 in the third, fourth, and fifth years, would be in addition to the annual appropriation of \$5 million for apportionment to the States for five years on a 75 percent-25 percent matching fund basis. The "Minority View" held by Senators Cannon, Cotton, Lausche, and Prouty, was that this new program cannot be justified in view of the current Federal budget deficit. The bill would authorize grants of \$28,250,000 over a five-year period, and reportedly cost \$400,000 a year to administer. Report also contains: purpose of the bill, section-by-section explanation, agency reports, appendix, and the minority view. (For hearings held on S. 627, see Fisheries Legislation.)

Senator Pell in the Senate on July 15, 1963, expressed his support for S. 627 (Bartlett et al.), stating, "Faced with the fact that in the recent past this Nation has dropped from second place to fifth place among the fishing nations of the world, S. 627 is designed to provide much needed assistance to the States in carrying out programs of research and development to help lift one of our oldest industries from its present depressed state. The bill would allow a direct attack on this truly national problem. . . I believe these positive features of the bill plus the overwhelming support expressed for it during the hearings conducted by the Committee on Commerce are impressive evidence that this legislation is both worthy and urgently needed. I sincerely urge Senators to give S. 627 most careful consideration."

Senator Gruening then added his support for S. 627 with the statement, "I am heartily in favor of this proposed legislation. It is one of the striking facts about this fisheries bill, to which sufficient attention has not been called, that this Congress and past Congresses have rendered very great aid to those who produce food from the land, but no corresponding effort has been undertaken to aid those who produce food from the sea. There has been a great disparity between the aid given our farmers and the aid not given our fishermen. I believe it is time for Congress to give to those who produce food from the sea attention and solicitude equal to what has been given to those who produce food from the land."

Senator Dodd in the Senate on July 16, 1963, expressed his support for S. 627 (Bartlett et al.). He stated, in part, "I cosponsored this legislation along with 30 of my colleagues who are greatly concerned, as I am, about the present condition of our commercial fishing industry."

"I think the financial assistance provided in this bill is a first step, an exceedingly modest first step, in an

effort to help a declining American industry. . . . I strongly urge passage of this legislation, when it is taken up later this week, and hope action will be possible in the House so that it can become law at the earliest possible moment."

Senate on July 18 took up and debated S. 627, to promote State commercial fisheries research and development activities, but it was displaced when other business was taken up on motion.

Senator Yarborough in the Senate on July 18, 1963, expressed his support for S. 627 stating, in part, "We need to increase our research in commercial fishing; the need has been convincingly demonstrated. This bill encourages the State to engage in this research. In the past 10 years, the United States has slipped from the second place to fifth among the fishing nations of the world, while we lead the world in importing fish for our domestic market.

"The Congress for decades has supported an extensive program of agricultural research; look at the bounty our farmers have produced. We now need to do the same for our vastly important, but often overlooked commercial fishing industry. As a coauthor of S. 627, I am hopeful that this measure will soon be reached on the calendar. The cost of the measure will be modest. The bill apportions the research funds among the States, and gives the States the aid, assistance, cooperation, and encouragement necessary to properly conserve and develop a great natural resource.

"As our population increases rapidly, we will be going more often to the sea to draw on those great resources. We need to stimulate our research in fishing so that we shall always be able to rely on that great food supply. . . ."

The Senate on July 22, 1963, passed S. 627, to promote State commercial fisheries research and development activities, after adopting a committee amendment (in the nature of a substitute) which had been amended by Senator Bartlett's amendment respecting preference given to a State suffering a commercial fishery failure due to disaster from natural causes. Prior to its passage, the Senate rejected Senator Cotton's motion to recommit the bill to the Committee on Commerce.

The legislation authorizes the Secretary of the Interior to cooperate with the States through their respective State agencies in carrying out projects designed for the research and development of the commercial fisheries resources of the Nation. Appropriations to carry out those purposes are authorized under section 4(a) and section 4(b) of the act.

Section 4(a) authorizes annual appropriations to the Secretary of the Interior of \$5 million during a total 5-year program. The funds would be apportioned among the States on a matching basis according to the extent of commercial fisheries in each State as represented by the value of raw fish harvested by domestic fishing vessels and received within each State plus the average value of the fishery products manufactured within each State.

Section 4(b) authorizes separate and additional annual appropriations to an interstate cooperative fund of \$500,000 for the first 2 years of the program and \$750,000 for the next 3 succeeding years, which shall be made available to States in amounts as the Secretary of the Interior may determine. In allocating such funds,

the Secretary shall give a preference to those States in which he determines there is a commercial fishery failure due to a resource disaster arising from natural causes, or a new commercial fishery can be developed.

Each State desiring to take advantage of any of the benefits of the act is required to submit plans for any proposed project to the Secretary of the Interior. The Secretary has authority to approve the plans and pay to the State the Federal share of any approved project in an amount not exceeding 75 percent of the total cost.

Senator Bartlett, in introducing his amendment to the committee amendment, stated, "The purpose of this amendment is to clarify the preference that is given to the States which qualify for the amounts authorized under section 4(b). A State can qualify if the Secretary determines that either one of the two conditions described exist in the State. The first condition is that there is a commercial fishery failure due to a resource disaster arising from natural causes. During the hearings, testimony was given which pointed out the severe problem that some States face in their development of a commercial fishery due to recent resource disasters that have arisen from natural rather than manmade causes.

"The second condition is directed at promoting the development of a relatively new or inactive commercial fishery. Testimony during the hearings pointed out that in many areas there was much work that should be accomplished to help new or recent commercial fisheries. Specifically, the committee was concerned with the problem of the inland States and the commercial development of such fishery products as the buffalo fish and yellow perch."

H. R. 7698 (Burke) and H. R. 7710 (St. Onge) introduced in House on July 23, 1963, and H. R. 7766 (Bates) introduced on July 25, 1963, to promote State commercial fishery research and development projects, and for other purposes; referred to the Committee on Merchant Marine and Fisheries. Similar to S. 627 passed by the Senate.

COMMODITY PACKAGING AND LABELING: Packaging and Labeling Legislation (Hearings before the Subcommittee on Antitrust and Monopoly of the Committee on the Judiciary, U. S. Senate, 88th Congress, 1st Session, pursuant to S. Res. 56 on S. 387), 552 pp., printed. Contains hearings held on March 6, 7, 12, 13, 19, 20, 21, and 22, 1963, on S. 387, to amend the Clayton Act to prohibit restraints of trade carried into effect through the use of unfair and deceptive methods of packaging or labeling certain consumer commodities distributed in commerce, and for other purposes; statements by Federal agencies, Congressmen, and industry personnel; the text of S. 387; written statements and letters submitted to Subcommittee; and biographical information.

CONSERVATION OF MARINE FISHERIES RESOURCES: S. 1816 (Gruening) introduced in Senate June 28, 1963, to conserve the offshore fishery resources of the United States and its territories, and for other purposes; referred to the Committee on Commerce. Whenever the Governor of any State or Territory alleges by a petition to the President of the United States that fishing by nationals of other nations in some or all of the coastal waters lying within twelve miles off the shores of such State or Territory is of such intensity or magnitude that the fishery resources in such waters are in danger of depletion, the President

shall appoint a Fact Finding Board. The Board shall investigate the allegations and make a report with recommendations to the President. The President may, by proclamation, prohibit fishing some or all of the coastal waters lying up to twelve miles off the coast of such State by any person not a national of the United States; establish conservation zones in the coastal waters lying up to twelve miles off the coast of such State or Territory; limit the amount and type of fishing which may be conducted in such zones; and set forth when and by whom fishing may be conducted in such zones. Senator Gruening in his statement upon introduction of the bill (Congressional Record, June 28, 1963, pages 11276-11281) included four exhibits which were: letter from the Legislative Attorney of the Library of Congress; letter from the Assistant Secretary of the State Department, with summary of unilateral claims to extend territorial seas or exclusive fishing zones, since the 1960 United Nations Conference on the Law of the Sea; contents of bill S. 1816, and a Proclamation and 2 Executive Orders (Nos. 9633 and 9634) from President Harry S. Truman.

FACTORY INSPECTION: H. R. 6788 (Harris) introduced in House June 4, 1963, to protect the public health by amending the Federal Food, Drug, and Cosmetic Act to extend and clarify existing inspection and investigative powers, require a premarketing showing of the safety of cosmetics, assure the safety, efficacy, and reliability of therapeutic, diagnostic, and prosthetic devices, improve the statutory coordination between that Act and the biological-drug provisions of the Public Health Service Act, provide for cautionary labeling of articles where needed to prevent accidental injury, and for other purposes; referred to the Committee on Interstate and Foreign Commerce. Would substantially increase the present factory inspection authority of Food and Drug Administration and would authorize inspectors of that organization to inspect "all things" contained in a food plant, "including records, files, papers, processes, controls and facilities" bearing on whether misbranded or adulterated foods have been or are being manufactured. Would exclude from inspection authority, research, financial, sales, pricing, and personnel data, other than that relating to qualifications of technical or professional personnel.

FISHERIES LEGISLATION: Fisheries Legislation (Hearings before the Merchant Marine and Fisheries Subcommittee of the Committee on Commerce, United States Senate, 88th Congress, 1st Session), 227 pp., illus., printed. Contains hearings held April 24 and 25, 1963, on S. 627, to promote state commercial fishery research and development, and for other purposes; S. 744, to authorize the Secretary of the Interior to construct two modern stern-ramp trawlers to be used for experimental, commercial fishing, research, and for other purposes; and S. 978, to provide medical care for certain persons engaged on board a vessel in the care, preservation, or navigation of such vessel. Also contains the text of the above bills; reports of various Government agencies; testimony of Government agencies, State Governments, Senators and Congressmen, and industry personnel.

FISHING LIMITS: Senator Bartlett (Alaska) on June 24, 1963 (Congressional Record, June 24, 1963, page 10689), presented to the Senate a statement on the straight baselines and fishing zones as being imperative for the United States. In part, he said: "... on June 4 of this year, Canadian Prime Minister Lester Pearson declared to the Canadian Parliament that the

time had come to 'take firm and national action to protect Canada's fishing industry'.

"Canada is not the only nation whose interests call for an extension of fishing rights and an adoption of the straight baseline method of measurement for the territorial sea. I have long insisted that it is imperative that the United States take similar steps.

"... the protection of our straits and inlets, and the need for clarity in the delineation of our territorial waters, make it imperative that we adopt the simple and widely accepted principle of straight headland-to-headland baselines for the measurement of our territorial waters. And in the interest of our fishery resources and our fishing industry, we must establish an exclusive fishing zone of 12 miles' width, measured from these baselines. It is my belief that the present international context and the approaching talks with the Canadian Government offer a uniquely opportune setting for an executive pronouncement adopting the straight baseline principle and an international agreement with Canada regarding an exclusive 12-mile fishing zone.

"In the first place, the nature of the international fishing situation has led an unprecedented number of nations to extend unilaterally their fishing waters. Other countries are acting on their own initiative regardless of whether or not we act. I view as particularly significant the numerous extensions of territorial waters and the establishment of exclusive fishing zones since the 1960 United Nations Conference on Law of the Sea.

FISHERY MARKETING ACT AMENDMENT: The Subcommittee on Merchant Marine and Fisheries of the Senate Committee on Commerce, June 27, 1963, held hearings on S. 1135, to make clear that fishermen's organizations, regardless of their technical legal status have a voice in the ex-vessel sale of fish or other aquatic products on which the livelihood of their members depends.

HEALTH, EDUCATION AND WELFARE APPROPRIATIONS, FY 1964: Departments of Labor and Health, Education, and Welfare Appropriations for 1964 (Hearings before a Subcommittee of the Committee on Appropriations, House of Representatives, 88th Congress, 1st Session, Part I and II), 1,343 and 712 pp., printed, respectively. Included in Part I is testimony on behalf of the Food and Drug Administration, and covering, among other subjects, food additives, pesticides, and water pollution control. Included in Part II (pages 493, 495 and 496) is testimony on shellfish sanitation, the establishment of two shellfish research centers, and the shellfish sanitation agreement with Japan.

IMPORT COMMODITY LABELING: On July 18, 1963, The Senate passed, with amendment, H. R. 2513, requiring certain new packages of imported articles to be marked so as to indicate the country of origin, and for other purposes.

The House on July 24, 1963, disagreed to Senate amendments to H. R. 2513; requested a conference with the Senate; and appointed as conferees Representatives Mills, King, O'Brien, Byrnes, and Baker.

On July 25, 1963, the Senate insisted on its amendment to H. R. 2513; agreed to hold the conference requested by the House; and appointed as conferees Senators Byrd, Long, Smathers, Williams, and Carlson.

INTERIOR DEPARTMENT APPROPRIATIONS, FY 1964: Interior Department and Related Agencies Appropriations for 1964 (Hearings before a Subcommittee of the Committee on Appropriations, U. S. Senate, 88th Congress, 1st Session), 1,729 pp., printed. Contains hearings held on H. R. 5279, making appropriations for the Department of the Interior and related agencies (including the Fish and Wildlife Service and its Bureau of Commercial Fisheries and Bureau of Sport Fisheries and Wildlife), for the fiscal year ending June 30, 1964, and for other purposes. Included is the testimony for funds for the Fish and Wildlife Service.

The House on July 10, 1963, disagreed to the Senate amendments to H. R. 5279; agreed to a conference requested by the Senate; and appointed as Conferees Representatives Kirwan, Denton, Cannon, Harrison, and Reifel. The Conferees met on July 11, 1963, in executive session.

The House on July 11, 1963, received from the Committee of Conference, the conference report (H. Rept. 551) on H. R. 5279.

H. Rept. 551, Department of the Interior and Related Agencies Appropriation Bill, 1964 (July 11, 1963, a Conference Report from the Committee of Conference, House of Representatives, 88th Congress, 1st Session, to accompany H. R. 5279), 12 pp., printed. The Committee of Conference came to agreement and presented their recommendations to the respective Houses. The Conferees agreed to appropriate \$17,832,900 for management and investigations of resources instead of \$17,175,000 as proposed by the House and \$18,682,500 as proposed by the Senate. The increase provided over the House bill includes \$136,800 for initiation of a North Pacific gear research and development program; \$87,600 for expansion of research on effects of pesticides; \$6,500 for payment to employees' compensation fund; \$50,000 for 1964 Pay Act costs; \$92,000 for technical assistance on commercial fisheries in the Big Bend and other reservoir areas in South Dakota; \$125,000 for biological studies of menhaden in the Gulf of Mexico; \$60,000 for research on means of controlling the red tide phenomenon; and \$100,000 to promote the production of oysters by the propagation of disease-resistant strains. The Conferees appropriated \$4,450,000 for construction instead of \$1,800,000 as proposed by the House and \$4,458,000 as proposed by the Senate. The increase provided over the House bill is for construction of a fishery research vessel for use in the North Pacific and Bering Sea. Appropriated \$653,000 for general administrative expense as proposed by the Senate instead of \$640,000 as proposed by the House. The increase provided over the House bill is for replacement of an obsolete accounting machine.

For the Bureau of Sport Fisheries and Wildlife the Conferees agreed to appropriate \$30,589,900 for management and investigations of resources instead of \$29,879,400 as proposed by the House and \$31,685,400 as proposed by the Senate. The increases of interest to commercial fisheries are: \$55,000 for expansion of reservoir research program in the Missouri River Basin; \$30,000 for a cooperative fishery unit at the University of Idaho; and \$30,000 for a cooperative fishery unit at Pennsylvania State University. Appropriated for construction was \$5,243,500 instead of \$3,678,000 as proposed by the House and \$5,898,500 as proposed by the Senate. The increase provided over the House bill includes \$80,000 for acquiring a surplus

vessel for the Sandy Hook Marine Laboratory, New Jersey.

Appropriation for the Office of the Commissioner was \$386,000.

By a record vote of 326 yeas to 50 nays, the House on July 17, 1963, adopted the conference report (H. Rept. 551) on H. R. 5279. The Senate on July 18, 1963, adopted the conference report (H. Rept. 551) on H. R. 5279. The action cleared the bill for the President's signature.

The President on July 25, 1963, signed H. R. 5297 into law (P. L. 88-79).

MEDICAL CARE FOR VESSEL PERSONNEL: S. Rept. 194, Medical Care for Fishing Boat Owners (May 27, 1963, report from the Committee on Commerce, U. S. Senate, 88th Congress, 1st Session to accompany S. 978), 18 pp., printed. The Committee reported the bill favorably and recommended passage. Contains the purpose of the bill, legislative history, costs, various agency reports, appendix, and changes in existing law. (See Fisheries Legislation for hearings held on S. 978.)

OCEANOGRAPHIC RESEARCH PROGRAM: The Subcommittee on Oceanography of the House Committee on Merchant Marine and Fisheries met in executive session on July 23, 1963, and ordered favorably reported to the full committee H. R. 6997, to develop and maintain a long-range national program in oceanography. The House Committee on Merchant Marine and Fisheries met in executive session on July 25, 1963, and ordered favorably reported to the House H. R. 6997.

PACIFIC ISLANDS TRUST TERRITORY DEVELOPMENT: On July 17, 1963, the House Committee on Interior and Insular Affairs ordered reported favorably, amended, H. R. 3198, to promote the economic and social development of the Trust Territory of the Pacific Islands, and for other purposes.

PACIFIC MARINE FISHERIES COMMISSION: The House on July 22, 1963, received a letter from the Chairman, Pacific Marine Fisheries Commission transmitting the 15th Annual Report of the Pacific Marine Fisheries Commission for the year 1962; referred to the Committee on Merchant Marine and Fisheries.

PRICE-QUALITY STABILIZATION: The House on July 22, 1963, received the report (H. Rept. 566) on H. R. 3669, to amend the Federal Trade Commission Act, to promote quality and price stabilization, to define and restrain certain unfair methods of distribution and to confirm, define, and equalize the rights of producers and resellers in the distribution of goods identified by distinguishing brands, names, or trademarks, and for other purposes, with amendment; referred to the Committee of the Whole House on the State of the Union.

RESEARCH PROGRAMS: H. Res. 455 (Elliott), H. Res. 456 (Smith), H. Res. 457 (Bolling), and H. Res. 458 (Brown) introduced in House July 24, 1963, to create a select committee to investigate expenditures for research programs conducted by or sponsored by the departments and agencies of the Federal Government; referred to the Committee on Rules.

RUSSIAN TRAFFIC IN UNITED STATES TERRITORIAL WATERS: The House Subcommittee for Special Investigations of the Armed Services Committee held public hearings on July 9-10, 1963, on Russian trawler traffic in territorial waters of the U. S., particularly off the coast of Florida.

In his opening statement, Rep. Porter Hardy, Jr. (Va.) outlined the purpose of the hearings and stated: "The size of Russia's fishing fleet has been variously estimated at from 23,000 to 25,000 steam and diesel propelled vessels of modern design and capabilities. They are scattered around the world engaged perhaps partly in fishing, but perhaps also gathering scientific data and other intelligence of military value. . . . There is also reason to believe that many of the trawlers are commanded by Russian naval officers. According to the Soviet Minister for the fishing industry, Russia has hundreds of these fishing vessels in the North Atlantic. . . . The hearing which began July 9, 1963, will be concerned with a portion of these Russian ships which cruise our Atlantic coastline, particularly along the coast of Florida. Although Russian fishing vessels have been observed off the coast for the past three years, it was not until six or seven months ago that they were observed cruising southward close into the Florida shore--within the three-mile limit. . . . Do these vessels constitute a threat to our national security? And if so, of what nature and magnitude? . . . To help the Subcommittee find the answers to these and other questions which will be raised, we have asked the Navy, the Coast Guard, and the Department of State to give us the benefit of their knowledge."

Testimony was given by various Federal agencies and public witnesses. Hearings were adjourned subject to call.

STATE DEPARTMENT APPROPRIATIONS FY 1964: Departments of State, Justice, and Commerce, the Judiciary, and Related Agencies Appropriations for 1964 (Hearings before a Subcommittee of the Committee on Appropriations, House of Representatives, 88th Congress, 1st Session), 1,639 pp., printed. Included in the appropriations for the State Department are funds for the international fisheries commissions in the amount of \$2,053,000, an increase of \$143,000 over the FY 1963 appropriations of \$1,910,000. There are increases for the International Pacific Salmon Fisheries Commission, Inter-American Tropical Tuna Commission, International North Pacific Fisheries Commission, and Great Lakes Fishery Commission. There is a decrease of \$160,950 for the International Pacific Halibut Commission, resulting from the completion of the 2-year survey of the halibut and groundfish resources in the Gulf of Alaska. There are also funds (the same as in 1963) for the International Whaling Commission, International Commission for the Northwest Atlantic Fisheries, and the North Pacific Fur Seal Commission.

H. R. 7063 (Rooney) introduced in House June 14, 1963, making appropriations for the Departments of State, Justice, and Commerce, the Judiciary, and related agencies for the fiscal year ending June 30, 1964, and for other purposes. The bill was favorably reported (H. Rept. 388) by the Committee on Appropriations on the same date. Included in the appropriations for the Department of State are funds for the international fisheries commissions.

H. Rept. 388, Department of State, Justice, and Commerce, the Judiciary, and Related Agencies Appropriation Bill, Fiscal Year 1964 (June 14, 1963, report from the Committee on Appropriations, House of Representatives, 88th Congress, 1st Session), 45 pp., printed. The Committee recommended an appropriation of \$1,910,000 for the international fisheries commissions, the same as the 1963 appropriation, but less than the budget estimate of \$2,053,000.

STERN RAMP TRAWLERS: See Fisheries Legislation for hearing held on S. 744.

SUPPLEMENTAL APPROPRIATIONS FY 1963: Supplemental Appropriation Bill, 1963 (Hearings before a Subcommittee of the Committee on Appropriations, House of Representatives, 88th Congress, 1st Session), 779 pp., printed. Contains hearings held on proposed supplemental appropriations for the fiscal year 1963. Included are funds for the Bureau of Commercial Fisheries in the sum of \$672,000 needed to finance the development and perfection of commercial techniques for production of fish protein concentrate, and to cover pay increases. Also contains statements of various Federal agencies and others as submitted to the Committee.

The bill H. R. 5517 was signed by the President May 17, 1963 (P. L. 88-25). The Bureau of Commercial Fisheries received an appropriation of \$658,400.

TUNA FISHING VESSEL PROTECTION: H. R. 7602 (Wilson) introduced in House July 16, 1963, to amend the Foreign Assistance Act of 1961 to provide for a method of reimbursing owners of certain fishing vessels which are subjected to harassment by officials of countries of South and Central America; referred to the Committee on Foreign Affairs.

Describing the provisions of H. R. 7602, Representative Wilson said, "Specifically, it calls for the withholding each fiscal year, out of foreign aid funds for Central and South American countries, of \$200,000 from each country which has at any time during the preceding fiscal year seized, inspected, detained, or required the licensing of vessels of U. S. registry and engaged in fishing more than 3 nautical miles offshore.

"The fund withholding would be waived for any country which assures the President that it will not harass U. S. fishing boats by imposing the restrictions I have listed.

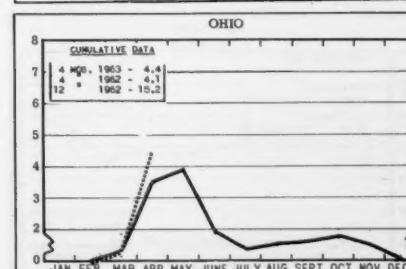
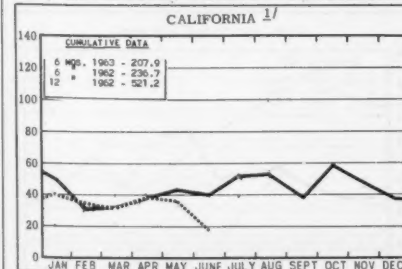
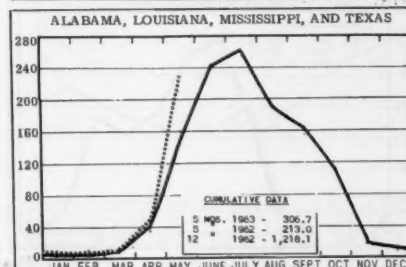
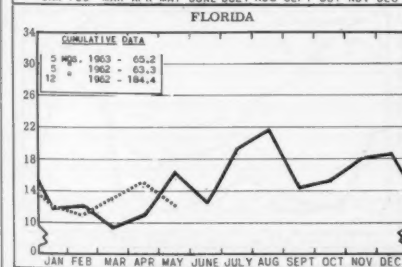
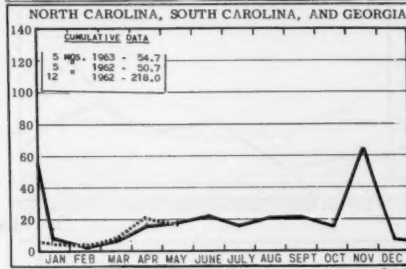
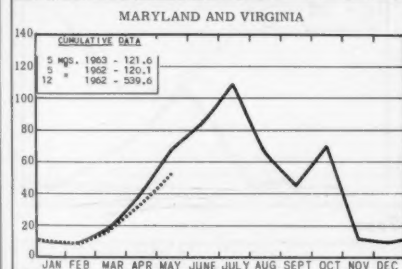
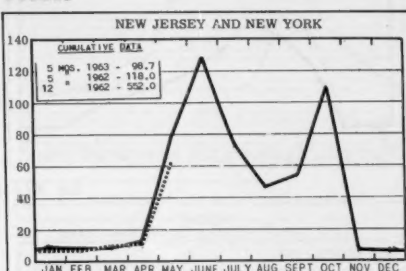
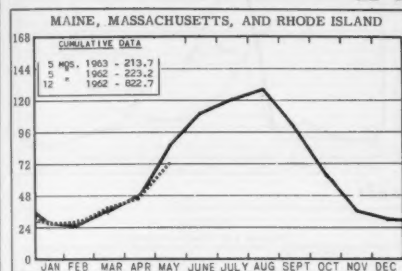
"The owners of boats would be reimbursed for costs of detention by a foreign government. Coverage would include fines, inspection fees, port fees, license fees, and the costs of idling the vessel. Should the total payments due U. S. fishermen from any one country's set-aside surpass \$200,000, the Secretary of State would be directed to pay the claims in full and report to Congress that the set-aside was inadequate. . . ."

VESSEL CONSTRUCTION SUBSIDY AMENDMENTS: Fishing Vessel Construction (Hearing before the Merchant Marine and Fisheries Subcommittee of the Committee on Commerce, U. S. Senate, 88th Congress, 1st Session), 108 pp., printed. Contains a hearing held May 7, 1963, on S. 1006, to amend the Act of June 12, 1960, for the correction of inequities in the construction of fishing vessels, and for other purposes. Would amend the law which provides a construction differential subsidy for fishing vessels by extending the life of the program from June 12, 1963, to June 30, 1972; by increasing the amount of the subsidy from a maximum of one-third to a maximum of one-half of the construction costs; and by broadening the scope of the law to permit participation by fisheries not eligible under the present law. Contained also is the text of the bill and Public Law 86-516; statements given by Government agencies, Congressmen, and industry people; reports from various Government agencies; and letters and correspondence received by the Committee.

FISHERY INDICATORS

CHART 1 - FISHERY LANDINGS for SELECTED STATES

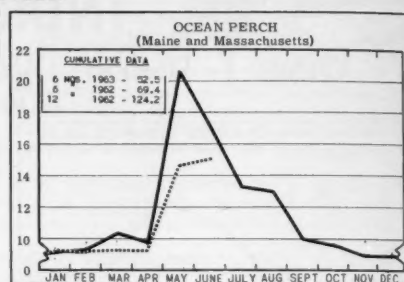
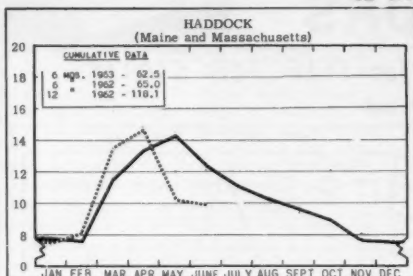
In Millions of Pounds



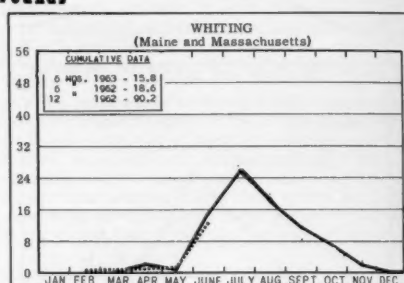
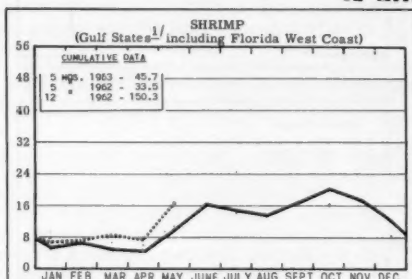
^{1/}ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

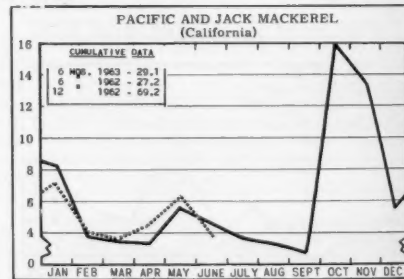
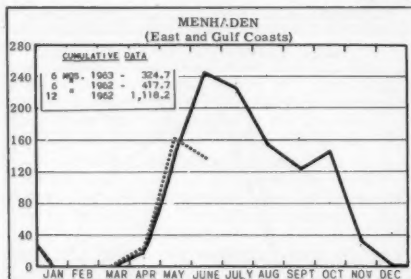


In Millions of Pounds

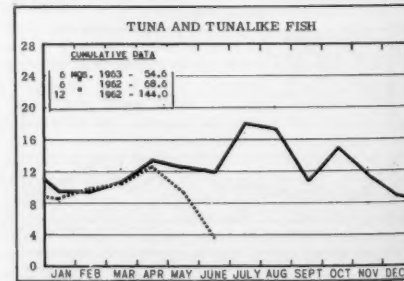
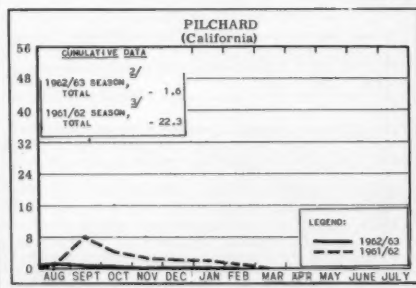


^{1/4} & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

In Thousands of Tons



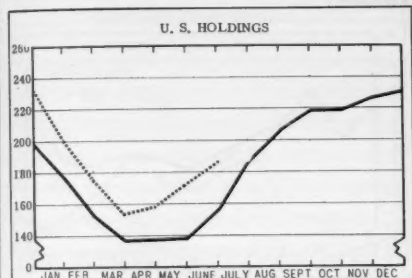
In Thousands of Tons



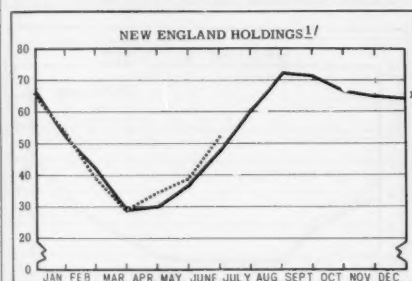
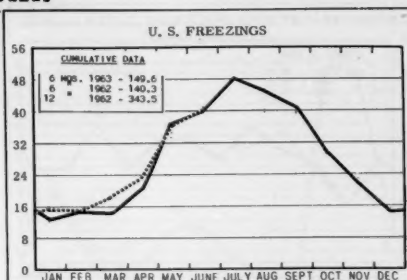
2/SEASON TOTAL, AUG. 1, 1962-FEB. 28, 1963. 3/SEASON TOTAL, AUG. 1, 1961-FEB. 28, 1962.

CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

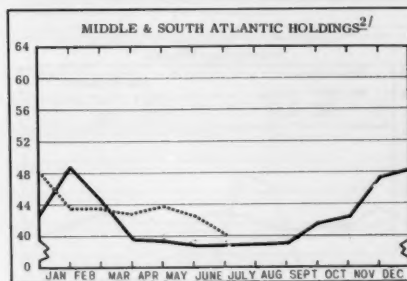
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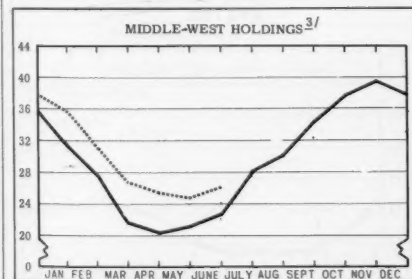
LEGEND:
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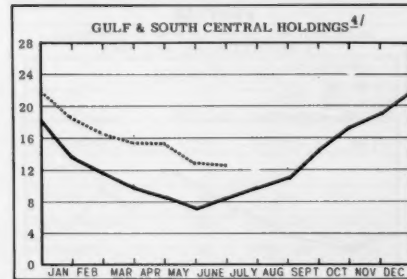
¹/MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT



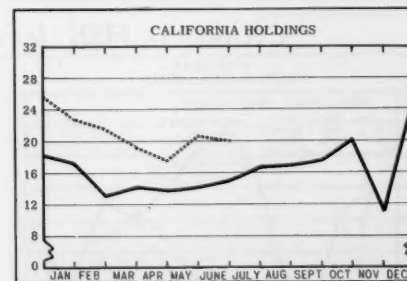
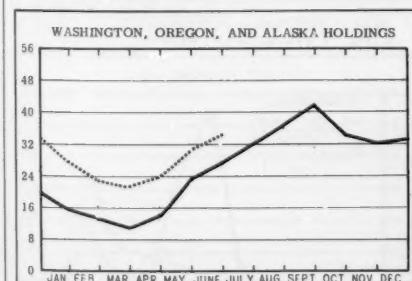
²/ALL EAST COAST STATES FROM N. Y. SOUTH.



³/OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR., & KANS.



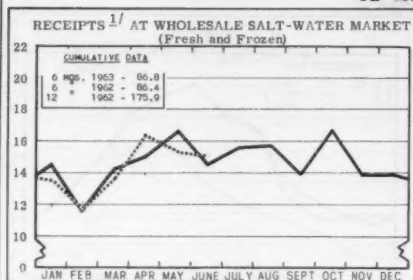
⁴/ALA., MISS., LA., TEX., ARK., KY., & TENN.



* Excludes salted, cured, and smoked products.

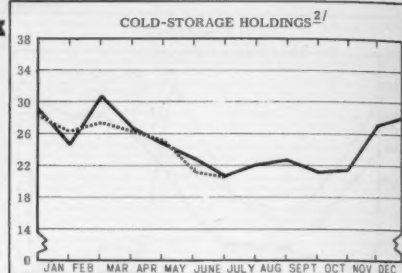
CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds

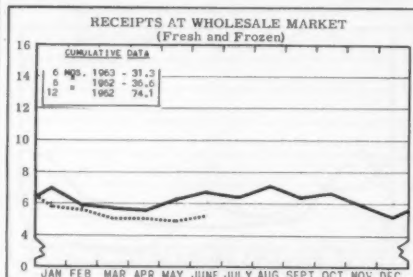


^{1/}INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.

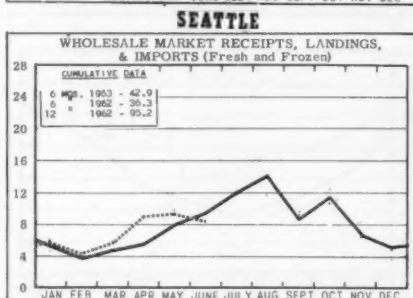
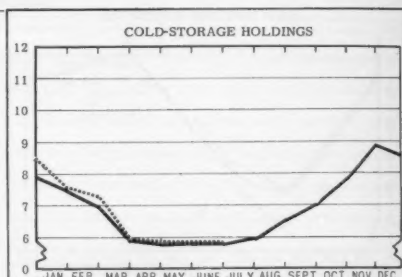
NEW YORK CITY



^{2/}AS REPORTED BY PLANTS IN METROPOLITAN AREA.



CHICAGO



LEGEND:
 1963
 - - - - - 1962
 1961

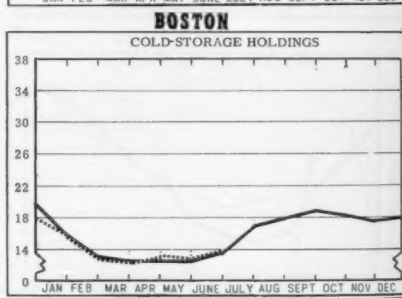


CHART 5 - FISH MEAL and OIL PRODUCTION

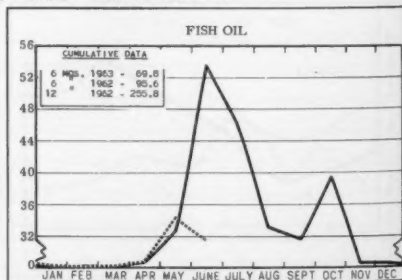
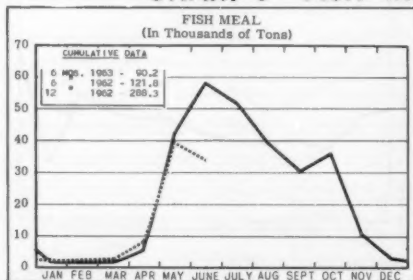
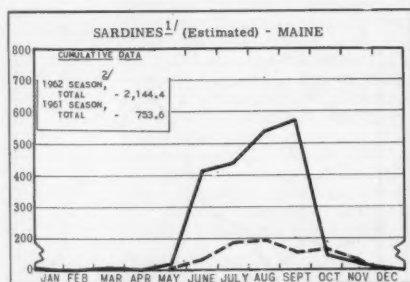
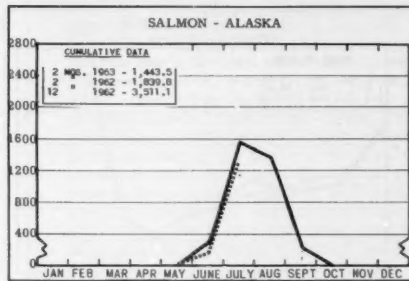
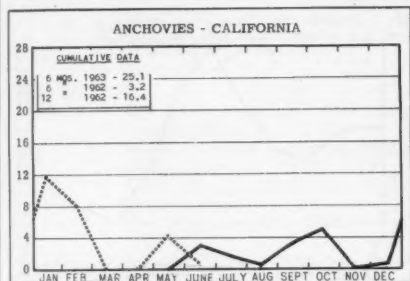
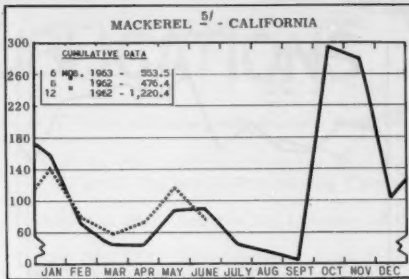
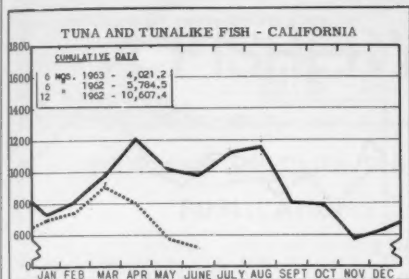


CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases



STANDARD CASES

Variety	No. Cans	Designation	Net Wgt.
SARDINES....	100	1/2 drawn	3 1/2 oz.
SHRIMP.....	48	--	5 oz.
TUNA.....	48	# 1 tuna	6 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	16 oz.
ANCHOVIES...	48	1/2-lb.	8 oz.

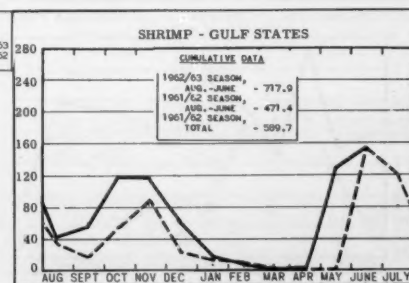
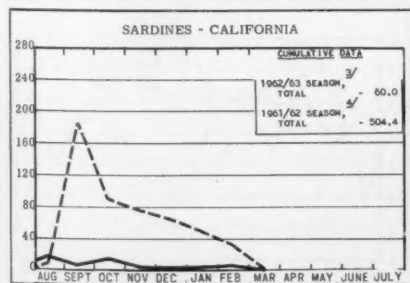
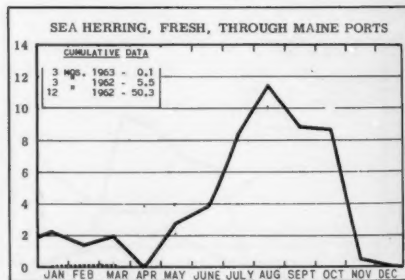
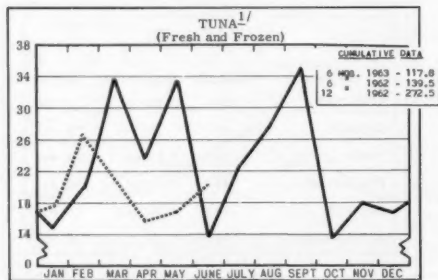
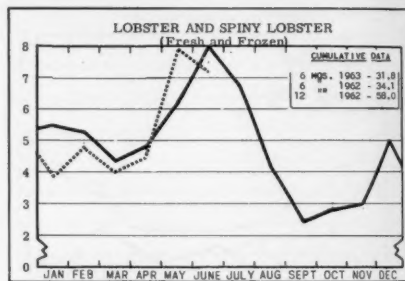
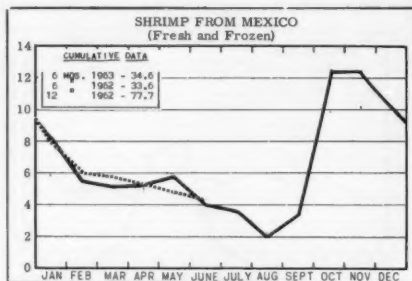
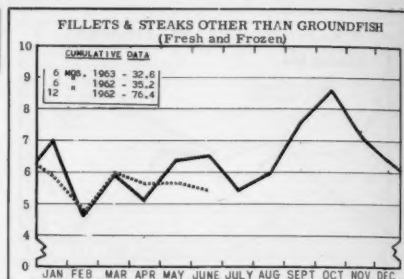
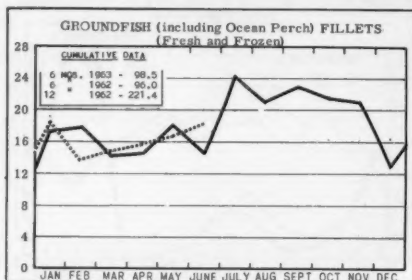
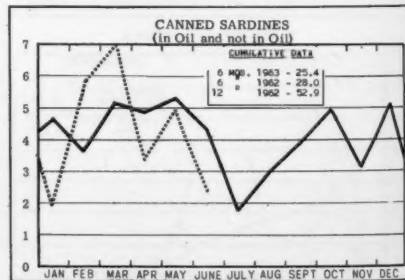
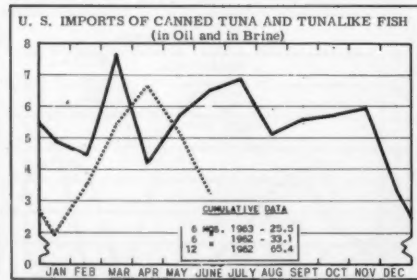


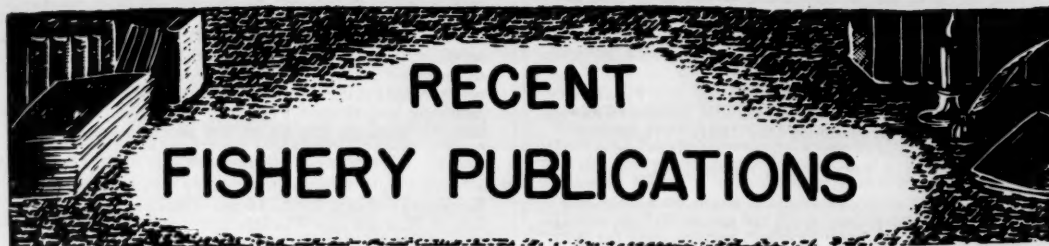
CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds



^{1/} EXCLUDES LOAMS AND DISCS.





RECENT FISHERY PUBLICATIONS

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE OFFICE OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
FL - FISHERY LEAFLETS.
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
SL - STATISTICAL LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.

Number	Title
CFS-3138	- New York Landings, 1962 Annual Summary, 12 pp.
CFS-3159	- North Carolina Landings, 1962 Annual Summary, 8 pp.
CFS-3180	- South Carolina Landings, 1962 Annual Summary, 5 pp.
CFS-3182	- Fish Meal and Oil, 1962 Annual Summary, 4 pp.
CFS-3190	- Frozen Fishery Products, April 1963, 8 pp.
CFS-3191	- Wisconsin Landings, 1962 Annual Summary, 3 pp.
CFS-3193	- Michigan Landings, February 1963, 3 pp.
CFS-3194	- Maryland Landings, March 1963, 3 pp.
CFS-3196	- Ohio Landings, March 1963, 2 pp.
CFS-3197	- Shrimp Landings, October 1962, 8 pp.
CFS-3198	- Virginia Landings, March 1963, 3 pp.
CFS-3199	- New York Landings, March 1963, 4 pp.
CFS-3201	- Mississippi Landings, March 1963, 3 pp.
CFS-3202	- Wisconsin Landings, March 1963, 2 pp.
CFS-3205	- Maine Landings, March 1963, 4 pp.
CFS-3206	- California Landings, March 1963, 4 pp.
CFS-3208	- North Carolina Landings, April 1963, 4 pp.
CFS-3210	- New Jersey Landings, March 1963, 3 pp.
CFS-3215	- Florida Landings, April 1963, 8 pp.

Wholesale Dealers in Fishery Products, 1962 (Revised):

- SL- 5 - Connecticut, 1 p.
SL- 20 - Texas (Coastal Area), 7 pp.
SL- 43 - Alabama (Mississippi River and Tributaries), 1 p.
SL- 45 - Mississippi (Mississippi River and Tributaries), 1 p.
SL-151 - Firms Manufacturing Marine Animal Scrap, Meal, Oil, Solubles, and Homogenized Condensed Fish, 1962 (Revised).
FL-547 - Bibliography of Publications of the Branch of Technology (Author Index, 1961), by F. Bruce Sanford and Helen E. Plastino, 4 pp., April 1963.
FL-548 - Living and Working Conditions on the Pribilof Islands, Alaska, by C. Howard Baltzo, 6 pp., illus., February 1963.

Sep. No. 680 - Mechanizing the Blue Crab Industry - Part I - Survey of Processing Plants.

Sep. No. 681 - Sea Scallop Industry of Canada.

Sep. No. 682 - Development of the John N. Cobb Pelagic Trawl-A Progress Report.

Biological Laboratory, Galveston, Texas, Fishery Research (for the year ending June 30, 1962), Circular 161, 105 pp., illus., 1962. Summarizes the research work carried out at the Galveston Biological Laboratory during the fiscal year ended June 30, 1962. Describes in detail research programs on the shrimp fishery, industrial fishery, estuaries, and physiology and behavior. Also includes special reports on chemicals toxic to the red-tide organism; marking spiny lobsters, *Panulirus argus*, and blue crabs, *Callinectes sapidus*, with biological stains; small beam net for sampling postlarval shrimp; use of Atkins-type tags on shrimp; immersion staining of postlarval shrimp; a device for measuring live shrimp; and distribution of pink shrimp larvae and postlarvae.

Distribution of Tunas in Oceanic Waters of the North-western Atlantic, by James L. Squire, Jr., Fishery Bulletin 211 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 62, pp. 323-341), 23 pp., illus., printed, 20 cents, 1962.

Economic Review of the Great Lakes Commercial Fisheries, 1940-1959, by Keith D. Brouillard, Circular 141, 20 pp., illus., 1963. Examines economic developments in the Great Lakes commercial fisheries since 1940. The catch, principal types of gear, marketing, and recent developments in the fishery also are reviewed. In a section on recommendations, the necessity for expanded research in fishing methods and marketing of the presently underutilized species is pointed out, consideration of fishermen's cooperatives is suggested, use of available species in new products is discussed, and cooperation among all research agencies is indicated to be a requirement if the fishing industry is to expand and strengthen its economic position.

THE FOLLOWING ENGLISH TRANSLATION OF A FOREIGN LANGUAGE ARTICLE IS AVAILABLE ONLY FROM THE CALIFORNIA AREA OFFICE, U. S. BUREAU OF COMMERCIAL FISHERIES, 101 SEASIDE AVE., TERMINAL ISLAND, CALIF.

Experiments on the Green Meat of Tuna, Translation Series No. 6, 53 pp., illus., processed, May 1963. (Translated from the Japanese, Report of Research Vessel "Shoyo Maru," 1960, May 1961.)

THE FOLLOWING ENGLISH TRANSLATIONS OF FOREIGN LANGUAGE ARTICLES ARE AVAILABLE ONLY FROM THE FISHERIES BIOLOGICAL LABORATORY, U. S. BUREAU OF COMMERCIAL FISHERIES, BOX 3830, HONOLULU, HAWAII.

Biological Comparison between the Pacific Tunas.

Part III, by Tsuyoshi Kawasaki and Masahiro Asano, 10 pp., illus., processed, May 1963. (Translated from the Japanese, Bulletin of Tohoku Regional Fisheries Research Laboratory, March 1962, No. 20, pp. 45-50.)

Some Data on the Ichthyofauna of Pacific Ocean Flotsam.

by L. N. Besednov, 7 pp., illus., processed, May 1963. (Translated from the Russian, Works of the Institute of Oceanology, vol. 41, 1960, pp. 192-197.)

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

Annual Report of the Bureau of Commercial Fisheries

Biological Laboratory, Beaufort, N. C. (For the Fiscal Year Ending June 30, 1961), Circular 148, 41 pp., illus., 1963. (Bureau of Commercial Fisheries, Biological Laboratory, Beaufort, N. C.) Presents information on research programs conducted by the laboratory including blue crab, shad, menhaden, Atlantic Coast striped bass, and radiobiological programs. Also discusses laboratory personnel participation in the Atlantic States Marine Fisheries Commission, work conferences with other Federal agencies, and other topics.

(Chicago) Monthly Summary of Chicago's Wholesale

Market Fresh and Frozen Fishery Products Receipts, Prices, and Trends, May 1963, 14 pp. (Market News Service, U. S. Fish and Wildlife Service, U. S. Customs House, 610 S. Canal St., Room 1014, Chicago 7, Ill.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and weekly wholesale prices for fresh and frozen fishery products; for the month indicated.

Gulf of Mexico Monthly Landings, Production and Shipments of Fishery Products, March 1963, 8 pp.

(Market News Service, U. S. Fish and Wildlife Service, Room 609, 600 South St., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; fishery imports at Port Isabel and Brownsville, Texas, from Mexico; Gulf menhaden landings and production of meal, solubles, oil; and sponge sales; for the month indicated.

A Guide and Key to the Aquatic Plants of the Southeastern United States, by Don E. Eyles and J. Lynne

Robertson, Jr., Circular 158, 155 pp., illus., printed, 1944, reprinted 1963, limited distribution. (Branch of Fishery Management Services, Bureau of Sport Fisheries and Wildlife, U. S. Fish and Wildlife Service, Washington 25, D. C.)

New England Fisheries--Monthly Summary, May 1963,

21 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial-fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery

landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly

Summary--April 1963, 16 pp. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; and landings at Fulton Fish Market docks and Stonington, Conn.; for the month indicated.

(Seattle) Washington and Alaska Receipts and Landings

of Fishery Products for Selected Areas and Fisheries, Monthly Summary, May 1963, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle 4, Wash.) Includes Seattle's landings by the halibut and salmon fleets reported through the exchanges; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl vessels as reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington Customs District; for the month indicated.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ALABAMA:

"Commercial and Sport Fishing on Guntersville Lake during the Period of March 15-June 13, 1960," by C. E. White Jr., and Ben Jacob, article, Proceedings of the Fifteenth Annual Conference, Southeastern Association of Game and Fish Commissioners, pp. 411-419, Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1961.

"An Evaluation of Prestocking Checks Conducted by Fishery Biologists in Alabama Ponds," by H. D. Kelly, article, Proceedings of the Fifteenth Annual Conference, Southeastern Association of Game and Fish Commissioners, pp. 186-193, printed, Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1961.

ALASKA:

"A Study of the Downstream Migrations of Anadromous Fishes in the Taku River, Alaska," by William R. Meehan and Donald B. Siniff, article, Transactions of the American Fisheries Society, vol. 91, no. 4,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

1962, pp. 399-407, printed, Secretary, American Fisheries Society, P.O. Box 483, McLean, Va.

BACTERIOLOGY:

Marine Microbiology (Deep Sea), by A. E. Kriss, 554 pp., printed, 126s. (about US\$17.65). Oliver and Boyd Ltd., 98 Gr. Russell St., London WC1, England, 1963.

BATHYSCAPH:

"The Bathyscaphe as an Acoustic Vehicle," by Don Walsh, article, Naval Research Reviews, April 1962, pp. 14-18, illus., processed, single copy 15 cents. Office of Naval Research, Washington, D. C. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C.) Discusses how the "Model T" of the deep submersibles is being relied upon to carry on an ambitious scientific program. "The bathyscaphe Trieste has now been in operation with the U.S. Navy for more than 3½ years. During that time this unique Bureau of Ships-Office of Naval Research-sponsored craft has proved the value of the manned deep submersible in oceanographic exploration. It is the purpose of this short discussion to outline past, present, and future acoustic programs for the craft and also to suggest some lines of interest that could be pursued," states the author.

BIBLIOGRAPHIES:

Bibliography of Oceanographic Publications, by Mark W. Pangborn, Jr., 23 pp., printed, Interagency Committee on Oceanography, Room 1714, Bldg. T-3, 17th St., and Constitution Ave. NW., Washington 25, D. C., 1963.

BRAZIL:

Brazil's Licensing and Exchange Controls, OBR-63-31, 12 pp., printed 15 cents. Bureau of International Commerce, U.S. Department of Commerce, Washington, D. C., January 1963. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C.) Discusses the import and export controls of Brazil, and United States import and export controls.

Sudene, Boletim de Estudos de Pesca, vol. 2, no. 8, August 1962, 17 pp., processed in Portuguese. Departamento de Estudos Especiais, Division de Pesca, Superintendencia do Desenvolvimento do Nordeste, Edificio Juscelino Kubitschek, 12º Andar, Recife, Brazil. Includes, among others, these articles: "Análise das Variáveis Estacionais da Produção de Lagosta na Paraíba" (Analysis at Various Stations of Spiny Lobster Production in Paraíba), by J. C. de Moura; "III Reuniao Nacional de Pesquisas sobre a Pesca Maritima" (Third National Meeting of Fishery Experts on the Marine Fishery), by J. C. de Moura; "Constituição da Pesca do Nordeste S/A" (Constitution of Fishermen's Society of Northeastern Brazil); "Segunda Operação de Pesca de Logosta do 'Presidente Kubitschek'" (Second Exploratory Spiny Lobster Cruise of the Presidente Kubitschek), by J. C. de Moura; and "Estudos da Biologia da Pesca de Lagostas" (Biological Studies in the Spiny Lobster Fishery).

Sudene, Boletim de Estudos de Pesca, vol. 3, no. 2, February 1963, 19 pp., illus., processed in Portuguese. Departamento de Estudos Especiais, Divi-

sao de Pesca, Superintendencia do Desenvolvimento do Nordeste, Edificio Juscelino Kubitschek, 12º Andar, Recife, Brazil. Includes, among others, these articles: "Pescarias de Corso Múltiplo com Pequenas Embarcações" (Fishing with Multiple Troll Lines on Small Vessels); "Tentativas dos Lagosteiros Franceses no Nordeste" (Efforts of the French Spiny Lobster Vessels in Northeast Brazil Waters); and "Pescarias de Atuns e Espécies Afins em Águas Costeiras" (Fishing for Tuna and Species Found in Coastal Waters), by J. Bonifacio Fonseca.

Sudene, Boletim de Estudos de Pesca, vol. 3, no. 3, March 1963, 26 pp., illus., processed in Portuguese. Departamento de Estudos Especiais, Divisao de Pesca, Superintendencia do Desenvolvimento do Nordeste, Edificio Juscelino Kubitschek, 12º Andar, Recife, Brazil. Contains, among others, articles on: "Experiencia com Rede de Espera em Pescarias de Lagosta" (Experiment with a Tangle Net in Fishing for Spiny Lobster), by Soloncy J. C. de Moura; and "A Pesca no Territorio de Fernando de Noronha" (The Fishery in the Waters of the Territory of Fernando de Noronha).

Sudene, Boletim de Estudos de Pesca, vol. 3, no. 4, April 1963, 26 pp., processed in Portuguese. Departamento de Estudos Especiais, Divisao de Pesca, Superintendencia do Desenvolvimento do Nordeste, Edificio Juscelino Kubitschek, 12º Andar, Recife, Brazil. Contains, among others, articles on: "Experimentos de Cultura Racional de Ostras" (Experiments with the Practical Culturing of Oysters); "Grupo de Trabalho para Desenvolvimento da Pesca" (Work Group for Fishery Development); and "Regulamento da Superintendencia do Desenvolvimento da Pesca" (Regulation for the Administration of Fishery Development).

CALIFORNIA:

California Fish and Game, vol. 49, no. 2, April 1963, 64 pp., illus., printed, single copy 75 cents. California Department of Fish and Game, Printing Division, Documents Section, Sacramento 14, Calif. Includes, among others, these articles: "An Evaluation of Five Tag Types Used in a Striped Bass Mortality Rate and Migration Study," by Harold K. Chadwick; and "Commercial Freshwater Fisheries of California," by Sterling P. Davis.

CAMBODIA:

Import Tariff System of Cambodia, OBR-63-48, 2 pp., printed, 15 cents. Bureau of International Commerce, U.S. Department of Commerce, Washington, D. C., February 1963. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C.) Presents information on units of currency, weights, and measures; tariff structure; method of payment of duty, sales and other internal taxes; trade restrictions; other special regulations; and related subjects.

CANADA:

"Canada's Fisheries Markets in 1962," by T. R. Kinsella, article, Foreign Trade, vol. 119, no. 9, May 4, 1963, pp. 2-8, illus., printed, single copy 25 Canadian cents. Queen's Printer, Government Printing Bureau, Ottawa, Canada. In 1962, the Canadian fisheries landed 1.98 billion pounds of ocean fish worth C\$114.4 million, 16 percent above the 1961 value;

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had an Atlantic coast catch worth \$67.6 million (up nearly \$7 million) and a Pacific Coast catch worth \$46.8 million; exported fisheries products worth \$156.6 million, an all-time record, to 88 countries; imported fisheries products worth \$19.6 million in first 11 months, with shrimp in the lead; made record sales of fresh and frozen fish worth \$103.1 million, with most going to the United States; sold abroad a large quantity of canned fish worth \$19.3 million as a result of large packs of pink salmon and sardines; and marketed \$12.7 million worth of fresh and frozen lobster in foreign countries, particularly the United States, according to the author.

"The Canadian Cod Fishery and The World Market," by Mary Hatheway, article, *Trade News*, vol. 15, no. 10-11, April-May 1963, pp. 7-9, processed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada. Discusses Canadian fishery products exports; trade with the United States; the 1962 catch of Atlantic groundfish--963 million pounds, including 586 million pounds of cod; the function of the International Commission for the Northwest Atlantic Fisheries (ICNAF); and economic trends in the Newfoundland cod fishery.

Journal of the Fisheries Research Board of Canada, vol. 20, no. 2, March 1963, 335 pp., illus., printed, single copy C\$1.50. Queen's Printer and Controller of Stationery, Ottawa, Canada. Includes, among others, these articles: "Big Effects from Small Causes: Two Examples from Fish Population Dynamics," by W. E. Ricker; "Growth and Mortality of Whitefish in Three Unexploited Lakes in Northern Canada," by W. A. Kennedy; "Summer Food of Lake Whitefish, *Coregonus clupeaformis* Mitchell, from Heming Lake, Manitoba," by N. H. F. Watson; "Some Aspects of Olfactory and Visual Responses in Pacific Salmon," by J. R. Brett and C. Groot; "Movements, Growth, and Survival of Marked and Tagged Lobsters Liberated in Egmont Bay, Prince Edward Island," by D. G. Wilder; "The Movement of Tagged Great Slave Lake Fish," by J. J. Keleher; and "Influence of Pond Formation on Brook Trout Movements and Angling Success," by M. W. Smith.

CARP:

Let's Go Carp Fishing, by W. R. Long, Information Leaflet, 8 pp., processed. Region III, Texas Game and Fish Commission, 530 Beckham St., Tyler, Tex. Discusses lakes and sluggish streams where carp are found; kinds of bait and tackle to use; and methods of storing, cleaning, and cooking.

CATFISH:

"Observations on the Food Habits of the Flathead and Blue Catfish in Alabama," by Bradford E. Brown and J. S. Dendy, article, *Proceedings of the Fifteenth Annual Conference Southeastern Association of Game and Fish Commissioners*, pp. 219-222. Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1961.

CEYLON:

Basic Data on the Economy of Ceylon, OBR-63-90, 20 pp., printed, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., April 1963. (For sale by the Superintendent of Documents, U. S. Government Printing Office,

Washington 25, D. C.) Discusses, among other items related to the economy of Ceylon, the fishing industry which has been furnished substantial foreign assistance and expert advice on the development of its fishery resources. Data on production, consumption, and number of persons engaged in Ceylon's fishing industry are included.

COD:

"La peche a la morue au Canada" (The Cod Fishery in Canada), by T. H. Turner, article, *La Peche Maritime*, vol. 43, no. 1021, April 1963, pp. 243-247, illus., printed in French, single copy 11 NF (about US\$2.25). Les Editions Maritimes, 190 Boulevard Haussmann, Paris, France.

"Transatlantic Journey of a Tagged Cod," by J. A. Gulland and G. R. Williamson, article, *Nature*, vol. 195, no. 4844, 1962, p. 921, printed. St. Martin's Press, Inc., 175 Fifth Ave., New York 10, N. Y.

CONGO REPUBLIC:

Import Tariff System of the Republic of the Congo (Leopoldville), OBR-63-82, 2 pp., printed, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., March 1963. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Presents information on units of currency, weights, and measures; bases of specific and ad valorem duties; customs surtaxes and internal taxes; shipping documents and fees; and trade restrictions.

CRABS:

The Glaucothoe Stage of DARDANUS VENOSUS (H. Milne-Edwards) (Decapoda: Anomura), by Anthony J. Provenzano, Jr., Contribution No. 443, 12 pp., illus., printed. (Reprinted from *Bulletin of Marine Science of the Gulf and Caribbean*, vol. 13, no. 1, March 1963, pp. 11-22.) The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

CZECHOSLOVAKIA:

"Ichtyofauna tokov juznych svahov Vihorlatu a Blatskej niziny" (Ichthyofauna of the Southern Slopes of Vihorlat and of the Blatska Lowland), by Juraj Holcik and Vitazoslav Misik, article, *Biologia*, vol. XVII, no. 6, 1962, pp. 422-439, illus., printed in Slovenian with Russian, German, and English abstracts. Vydava Vydavatel'stvo Slovenskej Akademie Vied, Bratislava, Czechoslovakia.

DENMARK:

Economic Developments in Denmark, 1962, OBR-63-58, 8 pp., printed, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., March 1963. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Contains, in addition to information on foreign trade and investment, a brief report on the Danish fishing industry in 1962.

Fiskeriundersogelser i 1962 ved Danmark, Faeroerne og Gronland (Fisheries Research in 1962 in Denmark, the Faroe, and Greenland), by E. Bertelsen and Paul M. Hansen, Skrifter fra Danmarks Fiskeri-og Havundersogelser Nr. 23, 114 pp., illus., printed in

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Danish, Kr. 9.75 (about US\$1.45). 1 Kommission Hos Andr. fr. Host & Son, Copenhagen, Denmark, 1963. Annual report of the biological research conducted by the staffs of the Danish Ministry of Fisheries and the Ministry for Greenland during 1962. The section on Denmark and the Faroese covers (1) Inner Danish Waters--plaice and cod fisheries in Bagenkop, Norway lobsters in the Skagerrak and the Kattegat, fishing eels with an air-bubble curtain; (2) The North Sea and the Skagerrak--sole population in the North Sea, turbot fishery potential in the North Sea, Danish and foreign plaice fisheries in the North Sea, features of the whiting's life history, the tide and the sand eel fishery, influence of storms on the blue mussel culture grounds; (3) Faroese and Northern Ocean Areas--coalfish at the Faroese; (4) Salmon and Fresh Water Fisheries--judgments for polluting fishing waters, 1955/1962, the Danish salmon fishery in the Baltic Sea, 1961/1962 season; and (5) Physiological and Other Experimental Research. The section on Greenland covers sharks in Greenland waters, and fishery research in the Umanak district in the summer of 1962.

-- A. W. Anderson

ECOLOGY:

"Ecological History of Lake Pontchartrain, An Estuarine Community," by Reznat M. Darnell, article, *The American Midland Naturalist*, vol. 68, no. 2, 1962, pp. 434-444, printed. American Midland Naturalist, University of Notre Dame, Notre Dame, Ind.

ELECTRICAL FISHING:

"Consideraciones sobre la Pesca por Medio de la Electricidad (Considerations on Electrical Fishing)," by R. Kleist, article, *Puntal* vol. 9, no. 102, September 1962, pp. 16-19, illus., printed in Spanish. Puntal, Apartado 316, Alicante, Spain.

"The Efficiency of a Direct Current Electric Fishing Method in Trout Streams," by J. S. Alabaster and W. G. Hartley, article, *The Journal of Animal Ecology*, vol. 31, no. 2, 1962, pp. 385-388, printed. Blackwell Scientific Publications, 24 Broad St., Oxford, England.

EVOLUTION:

"Biologist Explains Evolution of Fishes," by Barry O. Freeman, article, *Mississippi Game and Fish*, vol. 24, no. 16, March-April 1963, p. 13, printed. Mississippi Game and Fish Commission, Jackson, Miss.

FARM PONDS:

Farm Ponds in Douglas County, Kansas, and Their Use in Fish-Production, by Claude E. Hastings and Frank B. Cross, Miscellaneous Publication No. 29, 21 pp., printed. Museum of Natural History, University of Kansas, Lawrence, Kans., 1962.

FJI ISLANDS:

Import Tariff System of the Fiji Islands, OBR-63-39, 2 pp., printed, 15 cents. Bureau of International Commerce, U.S. Department of Commerce, Washington, D. C., March 1963. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C.) Presents information on units of currency, weights, and measures; bases of specific and ad valorem duties; method of pay-

ment of duty; sales and other internal taxes; consular documents and fees; trade restrictions; other special regulations; and related subjects.

FISH BEHAVIOR:

"The Fright Reaction of Fish," by Wolfgang Pfeiffer, article, *Biological Reviews*, vol. 37, no. 4, 1962, pp. 495-511, printed. Cambridge University Press, 200 Euston Rd., London NW1, England.

FISH ERADICANT:

"Toxaphene as a Fish Eradicant in Florida," by Melvin T. Huish, article, *Proceedings of the Fifteenth Annual Conference, Southeastern Association of Game and Fish Commissioners*, pp. 200-205, printed. Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1961.

FISHING GEAR:

"Les Engins de Peche, Les Nasses et Casiers (Fishing Gear, Traps and Lobster-Pots)," by A. Percier, article, *France Peche*, no. 66, October 1962, pp. 41-44, illus., printed in French. France Peche, Boite Postale 179, Lorient, France.

FISHING WITH LIGHTS:

"La Peche a la Lumiere, Peut-Elle Interesser un Jour Tous les Ports Francais (Fishing with Lights, Could it be of Interest in the future to all the French Fishing Ports)?" by Robert Lenier, article, *France Peche*, no. 67, November 1962, pp. 19-22, 24, illus., printed in French. France Peche, Boite Postale 179, Lorient, France.

FISH MEAL:

Nutrient Composition and Evaluation of British Columbia Whole Herring Meal, by B. E. March, J. Biely and H. L. A. Tarr, 10 pp., printed. (Reprinted from *Journal of the Fisheries Research Board of Canada*, vol. 20, no. 1, 1963, pp. 229-238.) Queen's Printer and Controller of Stationery, Ottawa, Canada.

FISH MUSCLE:

Apparatus for Measuring the Energy Input in Cutting Fibers of Fish Muscle, by Hans Buttkus, 6 pp., illus., printed. (Reprinted from *Journal of the Fisheries Research Board of Canada*, vol. 20, no. 1, 1963, pp. 181-186.) Queen's Printer and Controller of Stationery, Ottawa, Canada.

The Bound Nucleotides of Freshly Frozen and Severely Denatured Frozen Lingcod Muscle, by Neil Tomlinson and S. E. Geiger, 8 pp., printed. (Reprinted from *Journal of the Fisheries Research Board of Canada*, vol. 20, no. 1, 1963, pp. 187-194.) Queen's Printer and Controller of Stationery, Ottawa, Canada.

Red and White Muscle of Fish in Relation to Rigor Mortis, by Hans Buttkus, 17 pp., illus., printed. (Reprinted from *Journal of the Fisheries Research Board of Canada*, vol. 20, no. 1, 1963, pp. 45-58.) Queen's Printer and Controller of Stationery, Ottawa, Canada.

FISH POISONS:

Haptenic Properties of Paralytic Shellfish Poison, by J. E. Campbell, *Quarterly Progress Report* no. 8 (April 1-June 30, 1962), 18 pp., illus., printed. Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio, June 30, 1962.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

FISH PONDS:

"Results of a Six-Year Investigation of Chemical Soil and Water Analysis and Lime Treatment in Georgia Fish Ponds," by Willard W. Thomaston and Howard D. Zeller, article, Proceedings of the Fifteenth Annual Conference, Southeastern Association of Game and Fish Commissioners, pp. 236-245, printed, Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1961.

FISH POPULATIONS:

Certain of the Laws Governing the Effect of Fishing Operations on the Structure of Populations and the Individual Characteristics of Fish Belonging to Commercially Exploited Stocks, by G. V. Nikolskii, 21 pp., processed. (Translated from the Russian, Trudy Soveshchaniy, Ikht. Kom., vol. 13, 1961, pp. 21-33.) Fisheries Laboratory, Ministry of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England, 1962.

"The Effect of Black Bullhead Catfish and Bluegill Removals on the Fish Population of a Small Lake," by Alfred Houser and Bob Grinstead, article, Proceedings of the Fifteenth Annual Conference, Southeastern Association of Game and Fish Commissioners, pp. 193-200, printed, Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1961.

The Laws Governing the Dynamics of Fish Populations, by T. F. Dementieva and others, 20 pp., processed. (Translated from the Russian, Trudy Soveshchaniy, Ikht. Kom., vol. 13, 1961, pp. 7-20.) Fisheries Laboratory, Ministry of Agriculture, Fisheries and Food, Lowestoft, Suffolk, England, 1962.

"The Natural Regulation of Population in the Salmonidae," by K. Radway Allen, article, New Zealand Science Review, vol. 20, no. 3, 1962, pp. 58-62, printed, New Zealand Association of Scientists, Box 1874, Wellington, New Zealand.

FLORIDA:

The Ecology of Northern Florida Bay and Adjacent Estuaries, by Durbin C. Tabb and others, Technical Series No. 39, 81 pp., illus., printed, Florida State Board of Conservation, W.V. Knott Bldg., Tallahassee, Fla., November 1962.

MECOLIOTIA, a Gastropod Genus New to Florida, by Donald R. Moore, Contribution No. 452, 4 pp., illus., printed. (Reprinted from Bulletin of Marine Science of the Gulf and Caribbean, vol. 13, no. 1, March 1963, pp. 73-76.) The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

A New Species of LYSIOSQUILLA (Crustacea, Stomatopoda) from the Northern Straits of Florida, by Raymond B. Manning, Contribution No. 445, 4 pp., illus., printed. (Reprinted from Bulletin of Marine Science of the Gulf and Caribbean, vol. 13, no. 1, March 1963, pp. 54-57.) The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

FLUKE:

"The Fluke Population of Great South Bay in Relation to the Sport Fishery," by John C. Poole, article, New York Fish and Game Journal, vol. 9, no. 2,

1962, pp. 94-117, printed, New York Conservation Department, Albany, N. Y.

FOOD AND AGRICULTURE ORGANIZATION:

Considerations on Fishery Oceanography, by Z. Popovici, FAO Fisheries Biology Technical Paper No. 29, 11 pp., processed, limited distribution. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, January 1963.

An International Service for Retrieving Aquatic Science Literature, by S. B. Salla, J. S. O'Connor, and R. A. Shappy, FAO Fisheries Biology Technical Paper No. 28, 9 pp., processed, limited distribution. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, November 1962.

Proceedings of the World Scientific Meeting on the Biology of Tunas and Related Species (Meeting held in La Jolla, Calif., July 2-14, 1962), edited by H. Rosa, Jr., FAO Fisheries Reports No. 6, vol. 1, 104 pp., processed. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, 1963. This volume is the revised version of the Draft Report, which was distributed to the participants and to the contributors to the World Meeting on the Biology of Tunas and Related Species. It covers the organization, objectives, and general results of the meeting; resolutions; and section and working group reports. The objectives of the meeting were: (1) to bring together participants from governments and private institutions engaged in studying the identity, distribution, behavior and potential yields of stocks of tunas, bonitos, and related species; and (2) to review and appraise (a) the development of tuna fisheries and their current commercial exploitation; (b) identity, distribution, behavior and potential yields of tuna stocks; (c) specific problems and outlook for future international cooperation in coordinating methods and programs of research; and (d) means whereby such international action could be made possible.

Rapport sur la Sardinelle (SARDINELLA AURITA Valenciennes, Atlantique africain) (Synopsis on the Biology of the Sardine, *Sardinella aurita* Valenciennes, African Atlantic), by E. Postel, FAO Fisheries Biology Synopsis No. 6, 46 pp., illus., processed in French, limited distribution. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, 1960.

Synopsis of Biological Data on Anchovy ENGRAULIS ENCRASICOLUS (Linnaeus) 1758 (Mediterranean and Adjacent Seas), by N. Demir, FAO Fisheries Biology Synopsis No. 26, 44 pp., illus., processed, limited distribution. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, January 1963.

Synopsis of Biological Data on Hilsa HILSA ILISHA (Hamilton) 1822, by S. R. Pillay and H. Rosa, Jr., FAO Fisheries Biology Synopsis No. 25, 70 pp., illus., processed, limited distribution. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, January 1963.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Synopsis of Biological Data on Sprat *SPRATTUS SPRATTUS* (Linnaeus) 1758 (Mediterranean and Adjacent Seas), by M. Demir, FAO Fisheries Biology Synopsis No. 27, 40 pp., illus., processed, limited distribution. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, February 1963.

FOOD PRESERVATION:

The Technology of Food Preservation, by Norman W. Desrosier, 414 pp., illus., printed, domestic \$9.50, foreign \$10.50. The Avi Publishing Co., Inc., P. O. Box 388, Westport, Conn., 1963. This is a timely book in view of the World Food Congress which was held in Washington, D. C., in June 1963. Although the theme of the Congress was "an attack on the citadels of hunger and malnutrition," it was evident that getting food to certain areas of the world involves the use of different types of preservation methods. Only the surface has been scratched in using preservation methods in order to more widely distribute the world's food supply. Application of present information on preservation of food could go far in reducing the number of hungry people in the world. The fundamental principles of food preservation are presented in this book. Included are the principles for the use of refrigeration, canning, drying and dehydrating, salting, fermentation, pickling, chemical additives, and radiation. Also, Chapter 1, "Introduction to Food Technology," is an excellent summary of some of the general knowledge on food preservation. Very timely is the author's statement: "With perhaps only ten percent of the world's population currently consuming preserved foods regularly as important components in diets, the potential for growth of the food preservation industry is enormous, and this growth is clearly recognized at this time. It is urgently needed." "Acceptable Food to Eat," Chapter 2, explores quite adequately the factors at play in describing good food from a sensual, nutritional, and public health standpoint. That the book is up to date is quite evident from the last chapter, "Preservation of Food"--it summarizes the fundamentals for radiation processing of foods. Fish and shellfish are mentioned in several places throughout the book, but not in the detail that those products merit in view of their perishability. The suggested reading lists at the end of each chapter are good; at the end of the book is a list of journals covering the topical areas of the text; and there is an adequate index. In general, this reviewer believes there should have been more on fishery products. However, this book will be of value to producers, processors, distributors, retailers, researchers, food technologists, home economists, and students.

--Joseph Pileggi

FOOD PROCESSING:

Food Processing Operations--Their Management, Machines, Materials, and Methods, vol. I, by Maynard A. Joslyn and J. L. Heid, 658 pp., illus., printed, domestic \$19.75, foreign \$20.75. The Avi Publishing Co., Inc., P. O. Box 388, Westport, Conn., 1963. This is one of a contemplated series of books which summarizes the numerous factors involved in successful food-processing operations--from the source of raw materials to the sales outlet. As the title indicates, this book discusses

management, machines, materials, and methods. Divided into three sections, the first section covers line and staff organization, functions, and techniques. Among the subjects covered in this section are production management techniques; industrial engineering; cost accounting techniques; bank financing; quality control (objectives, organization, methods, and equipment); statistical quality control; pack statistics as a tool of management; plant safety; and research and development. Facilities, utilities, and sanitation are examined in the second section. In addition to a chapter on food plant sanitation, the section discusses the use of electricity, water, steam, and refrigeration in food processing. There is even a chapter on radiation processing. The third section discusses raw materials--production, harvesting, receiving, and preparing. One chapter deals with commercial fishery methods, and included is a discussion of the major food fisheries, fishing gear and methods, and handling and preserving the catch. Another chapter deals specifically with the processing of seafoods, and examines handling of fresh and frozen fish, preparation of precooked frozen products, canning, curing, and shellfish. The objectives, as stated by the authors, in assembling the information included in the book are to: (1) furnish general management with a gage for sound evaluations and decisions by technical personnel; (2) furnish students and supervisors with a general knowledge of food-processing techniques, and provide a guide to detailed information on specific subjects; (3) promote coordination and cooperation of all facets of supervision in food-processing operations. The subjects covered are presented by individuals with established experience and skill. Each chapter contains a selected and adequate bibliography. The book has a very good index.

--Joseph Pileggi

FOREIGN POLICY:

The Department of State Bulletin, vol. XLVIII, no. 1244, April 29, 1963, 40 pp., printed, single copy 25 cents. Office of Media Services, Bureau of Public Affairs, U. S. Department of State, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Includes, among others, articles on: "The United States and Southeast Asia," by U. Alexis Johnson; "Readjusting United States Foreign Trade," by Leonard Weiss; and "The Foreign Aid Program," by Dean Rusk.

FRANCE:

"Bref Coup d'oeil sur la Production de l'industrie des Pêches en 1962" (A Brief Glance at the Fisheries Industries Production in 1962), by L. Caroual, article, *La Pêche Maritime*, vol. 42, no. 1021, April 1963, p. 226, printed in French, single copy 11 NF (about US\$2.25). Les Editions Maritimes, 190 Boulevard Haussmann, Paris, France.

"La Consommation en France des Produits de la Mer" (French Consumption of Marine Products), article, *Marchés du Poisson* (Fish Markets), vol. 1, no. 1, September 1962, pp. 15-18, illus., printed in French, annual subscription rate (11 issues) outside France 32 NF (about US\$6.50). *Marchés du Poisson*, Boite Postale No. 180, Lorient, France. This article is

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included among many others in the first issue of a new periodical devoted to the French fishing industry.

"Le 'New Deal' de la Pêche Française" (The "New Deal" in the French Fisheries), article, *La Pêche Maritime*, vol. 42, no. 1021, April 1963, pp. 217-225, illus., printed in French, single copy 11 NF (about US\$2.25), Les Editions Maritimes, 190 Boulevard Haussmann, Paris, France.

FREEZE-DRYING:

"Freeze-Drying Ready for Rapid Dollar Growth," article, *The Farm Index*, vol. 1, no. 2, November 1962, pp. 11-12, illus., printed, single copy 20 cents. Economic Research Service, U.S. Department of Agriculture, Washington, D.C. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.) "Freeze-drying, today's infant in food processing, is expected to be a one-half to one billion-dollar-a-year operation by 1970," states the author. Among the freeze-dried products now on the market are crab meat and shrimp. Among foods with a market potential for freeze-drying are fish cakes and fish sticks.

FREEZERSHIP:

The Conversion of the Side Trawler NARFI to Freeze Whole Fish, 2 pp., processed, J. & E. Hall Limited, Dartford, Kent, England, May 21, 1963.

FRESHNESS OF FISH:

Ein neues elektronisches Schnellverfahren zur Ermittlung der Frische von Seefischen (A New Electronic Method of Determining the Freshness of Salt-Water Fish), by Chr. Hennings, 17 pp., illus., printed in German. (Reprinted from *Zeitschrift für Lebensmittel-Untersuchung und -Forschung*, vol. 119, no. 6, 1963, pp. 461-477.) Institut für Fischverarbeitung der Bundesforschungsanstalt für Fischerei, Hamburg, German Federal Republic.

Fish Tester V, 11 pp., illus., printed. Inteletron International Electronics GmbH & Co., P.O. Box 12101, Hamburg-Lokstedt 1, German Federal Republic. Describes a fish freshness tester which was developed especially to enable the layman on board a trawler, in the fish market, and in the fish trade to determine the freshness of edible fish quickly and objectively without the fish being damaged or affected in any way. With its help, it is immediately possible (1) to check on board a trawler at any time the condition of the catch on ice, so that it can be decided whether to continue fishing or return to port; (2) to sort out the landed catch in the fish market according to quality; (3) to check and ensure the uniformity of quality in the auction boxes; (4) for the fish trade to check the goods acquired by it as to quality and storage possibilities, so that arrangements for the most economic transportation can be made; (5) for the fishing industry to sort out its raw material for definite manufacturing purposes, and to guarantee minimum qualities for deep-frozen fillets; and (6) for scientific research to study to a greater extent and more easily than before the influences affecting quality, and to check the efficiency of measures taken to maintain the quality.

FRESH-WATER FISH:

Freshwater Fishes of the World, by Gunther Sterba (translated and revised by Denys W. Tucker), 878

pp., 192 plates, illus., printed, 70s. (US\$9.80), Vista Books, Longacre Press, Ltd., London, England, 1962. Provides basic data on the identification and aquarium biology of some 1,300 species of fresh-water fish. This book was written for the serious aquarist, but since behavior investigations are becoming increasingly prominent in the ichthyological literature it is of value also to the zoologist.

GEAR:

"Evaluation of Effect of Trotline Use on the Potomac River Fishery," by Albert E. Sanderson, Jr., article, *Proceedings of the Fifteenth Annual Conference, Southeastern Association of Game and Fish Commissioners*, pp. 314-319, printed, Southeastern Association of Game and Fish Commissioners, Columbia, S.C., 1961.

"The Selectivity and Effectiveness of Bait and Snag Lines Fished in the TVA Lakes of Alabama," by C. E. White Jr., article, *Proceedings of the Fifteenth Annual Conference, Southeastern Association of Game and Fish Commissioners*, pp. 359-367, printed, Southeastern Association of Game and Fish Commissioners, Columbia, S.C., 1961.

GENERAL:

"Fisheries in the Year 2000," by J. L. Kask, article, *Canadian Fisherman*, vol. 50, no. 6, June 1963, pp. 42-45, illus., printed, single copy C\$3. National Business Publications Limited, Gardenvale, Quebec, Canada. Canada's top fisheries scientist takes a realistic look at the future and makes some predictions which raise the question--where will the Canadian fishing industry, at its present rate of progress, fit into such a future?

Fishing News International, vol. 2, no. 2, April-June 1963, 136 pp., illus., printed, single copy 6s. 6d. (about 95 U.S. cents). Arthur J. Heighway Publications Ltd., Ludgate House, 110 Fleet St., London EC4, England. Includes, among others, these articles: "Progress in Far East Fisheries," by D. B. Finn; "French Deep-Sea Fishing is at a Turning Point," by Dominique Gep; "Economic Potential of Australian Tuna," by D. J. Hardman; "Mechanization of Fishing Craft," by Jan-Olof Traung; "All-Aluminum Menhaden-Vessel," by J. D. Smith; "Expedition Fishing," by J. A. Hind; "Technical Advances in Knotless Nets," "Stern Trawling and Gear Design," by John Garner; "Bermuda Fisheries," by E. Hess; "Searching the Oceans," by A. G. Koganovsky; and "Place of Economics in Fisheries," by G. M. Gerhardsen.

GHANA:

Preparing Shipments to Ghana, OBR-63-93, 12 pp., printed, 15 cents. Bureau of International Commerce, U.S. Department of Commerce, Washington, D.C., April 1963. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.) Presents information on shipping documents; labeling, marking, and packing; customs procedures; and related subjects.

GOVERNMENT ASSISTANCE TO FISHERIES:

"Les Aides à la Pêche en Europe Occidentale" (Assistance to the Fisheries in Western Europe), article, *La Pêche Maritime*, vol. 42, no. 1021, April 1963, pp. 232-234, printed, single copy 11 NF (about

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

US\$2.25). Les Editions Maritimes, 190 Boulevard Haussmann, Paris, France.

GREECE:

Alieia (Fishing), vol. 16, no. 191, May 1963, 60 pp., illus., printed in Greek and English. Alieia, 51 Stadiou Str., Athens (121), Greece. Includes, among others, articles on: "Greek Fishing Production and Prices," by Basil D. Castriotis; "Greek Deep Sea Fishing and the EEC," by M. E. Galazidis; "The Effects of the Trawl Fishing on the Stocks of Different Commercial Species in Greek Waters," by C. I. Ananiadis; and "Sponge Collecting Aqua-Lungs Versus Heavy Diving Suits," by N. A. Komarow.

HADDOCK:

"Biologia, Biometria, Anatomia y Pesca del Agelfino (Melanogrammus aeglefinus)" (Biology, Biometry, Anatomy and Fishing of the Haddock--Melanogrammus aeglefinus), by Alfonso Lucio Rojo, article, Trabajos Instituto Espanol de Oceanografia, No. 27, 1959, pp. 1-67, printed in Spanish. Instituto Espanol de Oceanografia, Alcala 27, Madrid, Spain.

HERBICIDES:

"Preliminary Results of Herbicides Tested on Certain Aquatic Plants in Florida," by C. L. Phillippy, article, Proceedings of the Fifteenth Annual Conference, Southeastern Association of Game and Fish Commissioners, pp. 288-295, printed, Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1961.

HERRING:

"Storage of North Sea Herring in Cooled Sea Water. I--Technological Investigations," by S. I. Gakichko, K. M. Fomicheva, and T. A. Dubrovskaya; "II--Biochemical Investigations," by S. I. Konopkaite and others; "III--Microbiological Investigations," by R. M. Izrailit, articles, Kholodil'naia Tekhnika, no. 5, 1962, pp. 25-34, illus., printed in Russian. Kholodil'naia Tekhnika, c/o Four Continent Book Corp., 822 Broadway, New York 3, N. Y.

ICHTHYOLOGY:

Ichthyology, the Study of Fishes, by Karl F. Lagler, John E. Bardach, and Robert R. Miller, printed, \$12.50. John Wiley and Sons, Inc., 440 Fourth Ave., New York 16, N. Y., 1962. This book is not intended to be a comprehensive study but rather a treatment of the broad principles of the study of fishes. The text is developed in an orderly sequence of chapters, which include the relationships of fish to man and other animals; major groups of fishes; fish anatomy; skin; foods, nutrition, and growth; skeleton; build and movement; blood and circulation; respiration; excretion and osmotic regulation; reproduction; integration (nervous and endocrine systems); genetics and evolution; systematics and nomenclature; and ecology and zoogeography. The use of special references at the end of each chapter rather than through documentation is in keeping with the general aim of the text. Inclusion of both systematic and subject indexes add to the usefulness as a general reference.

INTERNATIONAL COMMISSIONS:

Report of Working Group of Scientists on Fishery Assessment in Relation to Regulation Problems (Supplement to Annual Proceedings, vol. 11), 81 pp.,

illus., printed, C\$2. International Commission for the Northwest Atlantic Fisheries, Halifax, N. S., Canada, 1962. A report submitted to the International Commission for the Northwest Atlantic Fisheries at the 11th Annual Meeting in Washington, D. C., June 1961. Covers methods and interpretation of mesh assessments; the fisheries for cod, ocean perch, haddock, and plaice; an evaluation of the Atlantic halibut fishery; mesh assessments at present levels of fishing, and evaluation of uniform versus differential mesh regulation; and other similar information.

ITALY:

Annuario Statistico della Pesca e della Caccia, 1962 (Annual Statistics of Fish and Game, 1962), vol. X, 1963, 180 pp., illus., printed in Italian. Istituto Centrale di Statistica, Italian Republic, Rome, Italy. Contains 1961 data with comparisons on fishery landings; and receipts, sales, and average prices at principal markets. Also contains hunting data.

IVORY COAST REPUBLIC:

Basic Data on the Economy of the Republic of Ivory Coast, OBR-63-32, 12 pp., illus., printed 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., January 1963. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Discusses, among other items, the fishing activity which takes place in the Gulf of Guinea and the sea and lagoons. Also discusses the development of the fishery industry for the world tuna market.

JAPAN:

Memoirs of the Faculty of Fisheries Kagoshima University, vol. 11, no. 2, December 1962, 104 pp., illus., printed in Japanese with English abstracts. The Faculty of Fisheries, Kagoshima University, Kagoshima, Japan. Includes, among others, articles on: "On the Effect of Trail Rope as a Jury Rudder of a Small Fishing Boat. I--Preliminary Experiments of Resistance and Yawing by a Model Ship," by Y. Narasako and T. Takeda; and "Notes on the Early Development of Scyllarid Lobster, Parribacus antarcticus (Lund)," by T. Saisho.

LOUISIANA:

"Freshwater Commercial Fishing in Louisiana," by Grits Gresham, article, Louisiana Conservationist, vol. 15, nos. 5 & 6, May-June 1963, pp. 6-8, 23, illus., printed. Louisiana Conservationist, Wild Life and Fisheries Bldg., 400 Royal St., New Orleans 16, La.

MACKEREL:

"A Histophysiological Study of the Red and White Muscles of the Mackerel," by J. C. George, article, The American Midland Naturalist, vol. 68, no. 2, 1962, pp. 487-494, printed. American Midland Naturalist, University of Notre Dame, Notre Dame, Ind.

MARINE FAUNA:

Dangerous Marine Animals, by Bruce W. Halstead, 146 pp., illus., printed \$4. Cornell Maritime Press, Inc., Box 109, Cambridge, Md., 1959.

MARLIN:

Postlarva of the White Marlin, TETRAPTURUS ALBIDUS, from the Florida Current Off the Carolinas,

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by Donald P. de Sylva, Contribution No. 456, 10 pp., illus., printed, (Reprinted from Bulletin of Marine Science of the Gulf and Caribbean, vol. 13, no. 1, March 1963, pp. 123-132.) The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

MISSOURI RIVER:

"Some Fishes of the Lower Missouri River," by Herbert J. Fisher, article, The American Midland Naturalist, vol. 68, no. 2, 1962, pp. 424-429. American Midland Naturalist, University of Notre Dame, Notre Dame, Ind.

NAVIGATION:

United States Coast Pilot 5, Atlantic Coast--Gulf of Mexico, Puerto Rico, and Virgin Islands, 264 pp., printed, \$2.50. Coast and Geodetic Survey, U. S. Department of Commerce, Washington 25, D. C., June 16, 1962. Includes the results of thorough field inspections made in the Gulf of Mexico in 1961, and in Puerto Rico and the Virgin Islands early in 1962.

NETS:

"Efficiency and Selectivity of Flag Gill Nets Fished in Lake Bistineau, Louisiana," by Victor W. Lambou, article, Proceedings of the Fifteenth Annual Conference, Southeastern Association of Game and Fish Commissioners, pp. 319-359, printed, Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1961.

NORTH ATLANTIC:

"Tilstanden i havet under den unormale vinter 1963" (Weather Conditions at Sea and in the Harbors during the Severe Winter of 1963), by Jens Eggvin, article, Fiskets Gang, vol. 49, no. 15, April 11, 1963, pp. 213-220, illus., printed in Norwegian with English summary. Fiskets Gang, Fiskeridirektoratet, Radstuplass 10, Bergen, Norway.

NORWAY:

"La Pesca y la Conserva Noruegas, en 1962" (The Norwegian Fishery and Canned Fish Pack in 1962), article, Industrias Pesqueras, vol. XXXVII, no. 864, April 15, 1963, pp. 136-137, printed in Spanish, single copy 35 ptas. (about 60 U. S. cents), Industrias Pesqueras, Policarpo Sanz, 21-2^a, Vigo, Spain.

"Smatralernes lonnsomhet 1961" (Small Trawler Earnings, 1961), article, Fiskets Gang, vol. 49, no. 14, April 4, 1963, pp. 197-202, printed in Norwegian. Fiskets Gang, Fiskeridirektoratet, Radstuplass 10, Bergen, Norway.

OCEANOGRAPHY:

"New Facilities at Woods Hole to Include Airplane," article, Newsletter, no. 1-63, January 31, 1963, pp. 1-2, illus., processed, National Oceanographic Data Center, Naval Weapons Plant, Washington 25, D. C.

"New Instrumentation Center Dedicated," article, Newsletter, no. 1-63, January 31, 1963, pp. 1-2, illus., processed, National Oceanographic Data Center, Naval Weapons Plant, Washington 25, D. C.

"Recent Developments in Research Instrumentation," article, Newsletter, no. 1-63, January 31, 1963, pp. 2-4, processed, National Oceanographic Data Center, Naval Weapons Plant, Washington 25, D. C.

A Review of "Oceanography 1960 to 1970" and Comments on the Interagency Committee on Oceanography, Fiscal Year 1962 Program, 47 pp., processed, Interagency Committee on Oceanography, Office of Naval Research, Room 1818, 17th St. and Constitution Ave. NW., Washington 25, D. C., August 1961.

The Sea (Ideas and Observations on Progress in the Study of the Seas), Vol. II--Composition of Sea Water (Comparative and Descriptive Oceanography), edited, by M. N. Hill, 569 pp., illus., printed, \$25. Interscience Publishers, John Wiley and Sons, Inc., New York, N. Y., 1963. This is the second volume of a three-volume series directed toward progress made in the study of the seas during the past 20 years and toward depicting present ideas and research trends. Subject matter ranges from the chemistry of the sea through productivity, food chain relations, and descriptions of current system and regional oceanography to the bathyscap as a research instrument. Biology is restricted to aspects directly related to the physical, chemical, and geological processes in the ocean and on its floor.

Serial Atlas of the Marine Environment--North Atlantic Temperatures at a Depth of 200 Meters, by Elizabeth H. Schroeder, Folio 2, 21 pp., illus., printed, American Geographical Society, Broadway at 156th St., New York 32, N. Y., 1963. About 96,000 temperature readings taken at the 200-meter depth throughout the North Atlantic have been organized and their distributions mapped in this folio. The Serial Atlas, a type of atlas never before produced in this country, was introduced last year with the publication of Folio 1, a study of sea surface temperatures in the Western North Atlantic. The Atlas is planned to foster more interdisciplinary communication and to provide scientists with an essential means of making comparative studies.

United States National Oceanographic Program, Fiscal Year 1962, Interagency Committee on Oceanography of the Federal Council for Science and Technology, 36 pp., processed, Interagency Committee on Oceanography, Office of Naval Research, Room 1818, 17th St. and Constitution Ave. NW., Washington 25, D. C., 1962.

PERU:

"Can Peru Maintain Its Rate of Fishing Growth?" by A. Jimenez, article, World Fishing, vol. 12, no. 5, May 1963, pp. 42-43, illus., printed, single copy 3s. (about 42 U. S. cents), John Trundell & Partners Ltd., St. Richard's House, Eversholt St., London NW1, England. The spectacular rise of the Peruvian fishing industry in the past 5 years has astonished the fishing world. About 1,000 purse seiners are now operating, 400 were built last year, and another 400 are planned for the current year. This article gives the background story and describes some of the ways in which it may develop.

PLANKTON:

"Plankton: Optimum Diversity Structure of a Summer Community," by Bernard C. Patten, article, Science, vol. 140, no. 3569, May 24, 1963, pp. 894-898, illus., printed, single copy 35 cents. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington 5, D. C.

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"Zooplankton Species Groups in the North Pacific," by E. W. Fager and J. A. McGowan, article, *Science*, vol. 140, no. 3566, May 3, 1963, pp. 453-460, illus., printed, single copy 35 cents. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington 5, D. C.

POLAND:

Polish Maritime News, vol. VI, no. 56, April 1963, 34 pp., illus., printed, Polish Chamber of Foreign Trade, Maritime Branch, Gdynia, ul. Pulaskiego 6, Poland. This number is devoted to sea fisheries and building of fishing vessels. It includes, among others, articles on expansion of sea fisheries, future tasks of the Polish sea fisheries, fish-processing industry, imports and exports, Sea Fisheries' Institute, deep-sea fisheries' schools, construction of fishing vessels, and building motherhips for fishing fleets. Also includes the following articles: "Starboard Fishing Trawler Build in Series on French Orders;" "A New Fish Factory-Trawler of 1,250 T.D.W.;" "B-21'-Type Fishing Trawler, General Arrangement and Description;" "Freezing Fishing Trawler of 1,300 T.D.W. Under Construction;" and "B-23'-Type Fishing Trawler of 600 T.D.W. with Freezing Arrangements."

POLLUTION:

"The Need and Value of Water Quality Criteria with Special Reference to Aquatic Life," by Clarence M. Tarzwell, article, *The Canadian Fish Culturist*, Issue 31, 1962, pp. 35-41, printed, Department of Fisheries of Canada, Ottawa, Canada.

"The Relative Resistance of Thirteen Species of Fishes to Petroleum Refinery Effluent," by Claud M. Ward and W. M. Irwin, article, *Proceedings of the Fifteenth Annual Conference, Southeastern Association of Game and Fish Commissioners*, pp. 255-276, printed, Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1961.

ROUGHFISH:

"Experimental Non-Game Fish Eradication Program," by Monte Richards, article, *Idaho Wildlife Review*, vol. XV, no. 1, July-August 1962, pp. 3-8, illus., printed, Idaho Fish and Game Commission, 518 Front St., Boise, Idaho.

SALMON:

"Atlantic Salmon Headed for Extinction?" by P. J. Antle, article, *Canadian Fisherman*, vol. 50, no. 6, June 1963, p. 54, illus., printed, single copy C\$3. National Business Publications Limited, Garden-ville, Quebec, Canada. All efforts should be directed towards eliminating the various causes responsible for the destruction of young salmon and the prevention of adults from reaching the spawning grounds. The alternative to this is continued depletion of the salmon population, states the author.

Estimating Absolute Age Composition of California Salmon Landings, by Joseph H. Kutkuhn, Fish Bulletin No. 120, 47 pp., printed, Documents Section, Printing Division, Department of Fish and Game, No. Seventh St., at Richards Blvd., Sacramento 14, Calif., 1963.

The History of the Early Stuart Sockeye Run, by A. C. Cooper and K. A. Henry, *International Pacific Salmon Fisheries Commission, Progress Report No. 10*, 52 pp., illus., processed, International Pacific Salmon Fisheries Commission, New Westminster, B. C., Canada, 1962. Historical evidence as far back as 1820 indicates that the Early Stuart sockeye run to the Fraser River never has been large and was subject to significant variations in abundance caused primarily by obstructions to its upriver migration in the Fraser Canyon. The construction of fishways at Hell's Gate, which had been an obstruction even prior to the Hell's Gate block in 1913, coupled with certain regulatory protection in the commercial fishery, increased the average size of the Early Stuart run about seven times during the period 1949 to 1961. The increased size of the run and the occurrence of high river levels in recent years during the upriver migration of the Early Stuart sockeye have led to the discovery of several points that are still obstructions or present difficult passage. Recommendations are made for the removal of the remaining known obstructions, which are estimated to have already caused a loss of nearly one million dollars in the catch of sockeye, and which could cause further and more serious losses in future years under similar river flow conditions.

"O Mekhanismakh Adaptatsii k Izmeneniyam Solenosti Vody u Nerka--Oncorhynchus nerka (Walb.)" (The Mechanisms of Adaptation of the Red Salmon--Oncorhynchus nerka Walb.--to Changes in the Salinity of Water), by M. G. Zaks and M. M. Sokolova, article, *Voprosy Ikhtiologii*, vol. 1, no. 2, 1961, pp. 338-346, printed in Russian, Akademia Nauk, SSSR, Ikhtologicheskaya Komissiya, Moscow, U.S.S.R.

Resumption of Feeding by and Survival of Adult Sockeye Salmon (ONCORHYNCHUS NERKA) Following Advanced Gonad Development, by J. R. McBride and others, 8 pp., illus., printed, (Reprinted from *Journal of the Fisheries Research Board of Canada*, vol. 20, no. 1, 1963, pp. 95-100.) Queen's Printer and Controller of Stationery, Ottawa, Canada.

"The Salmon Fishery in Nova Scotia," by N. E. J. MacEachern and J. R. MacDonald, article, *The Canadian Fish Culturist*, Issue 31, 1962, pp. 43-57, printed, Department of Fisheries of Canada, Ottawa, Canada.

"Salmon with Fish-Hooks," by H. Isak, article, *Biological Abstracts*, vol. 40, no. 6, part 1, 1962, no. 21922, printed, University of Pennsylvania, 3815 Walnut St., Philadelphia 4, Pa.

Studies of Alaska Red Salmon, edited by Ted S. Y. Koo, 457 pp., illus., printed, \$8.50. University of Washington Press, Seattle, Wash., 1962.

"Territorial Behavior of Juvenile Atlantic Salmon (*Salmo salar* L.)," by Miles H. A. Keenleyside and Fred T. Yamamoto, article, *Behaviour*, vol. 19, no. 1-2, 1962, pp. 139-169, printed, E. J. Brill, Leiden, Netherlands.

SARDINES:

Works of the Institute of Oceanography and Fisheries, OTS 60-21660, 111 pp., illus., printed, \$1. Translated from the Serbo-Croatian, *Godisnjak*, vol. 2, 1939/1940; *Izvjescja*, vol. 4, no. 40, 1954; and *Go-*

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

disnjak, vol. 1, 1938.) Office of Technical Services, U. S. Department of Commerce, Washington 25, D.C., 1962. Includes the following articles: "The Food of Sardines (*Clupea pilchardus* Walb.) in the Metamorphic Stage," by A. Ercegovic; "The Spawning and Spawning Areas of the Sardine (*Sardinus pilchardus* Walb.) in the Adriatic Sea from 1947-1950," by T. Gamulin; and "The Importance of Fishery Statistics to the Study of Marine Fishery Biology with Special Regard to the Adriatic Sardine," by A. Kotthaus.

SEA LAMPREY:

"Sea Lamprey Larvae in Lentic Environments," by Wilbert C. Wagner and Thomas M. Stauff, article, *Transactions of the American Fisheries Society*, vol. 91, no. 4, 1962, pp. 384-387, printed. Secretary, American Fisheries Society, P. O. Box 483, McLean, Va.

SEA URCHIN:

The Biology of LYTECHINUS VARIEGATUS, by H. B. Moore and others, Contribution No. 444, 31 pp., illus., printed. (Reprinted from *Bulletin of Marine Science of the Gulf and Caribbean*, vol. 13, no. 1, March 1963, pp. 23-53.) The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

SHAD:

"The Occurrence and Distinction of Threadfin Shad in Southern California Ocean Waters," by James C. Thomas, article, *California Fish and Game*, vol. 48, no. 4, 1962, pp. 282-283, printed. Printing Division, Documents Section, No. Seventh St. at Richards Blvd., Sacramento 14, Calif.

SHRIMP:

"Biology of the Sand Shrimp, *Crangon septemspinosa*, in the Shore Zone of the Delaware Bay Region," by Kent S. Price, Jr., article, *Chesapeake Science*, vol. 3, no. 4, December 1962, pp. 244-255, illus., printed, single copy 75 cents. Natural Resources Institute, University of Maryland, Chesapeake Biological Laboratory, Solomons, Md.

SPAIN:

Act No. 147/1961 on the Renewal and Protection of the Fishing Fleet, *FAO--Food and Agriculture Legislation*, vol. XI, no. 3, December 23, 1961, Spain, XVI/4, 7 pp., printed, \$1. (Boletín Oficial del Estado No. 311, December 29, 1961, p. 18345.) Columbia University Press, International Documents Service, 2960 Broadway, New York 27, New York. Part I describes the general provisions of the Act; Part II, regulation of sea fisheries; Part III, plan for renewal and enlargement of the fishing fleet; and Part IV, exemptions from taxes and duties.

SPEARFISH:

A New Western Atlantic Spearfish, *TETRAPTURUS PFLUEGERI*, with a Redescription of the Mediterranean Spearfish, *TETRAPTURUS BELONE*, by C. Richard Robins and Donald P. de Sylva, Contribution No. 455, 39 pp., illus., printed. (Reprinted from *Bulletin of Marine Science of the Gulf and Caribbean*, vol. 13, no. 1, March 1963, pp. 84-122.) The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

SPORT FISHING:

"A Survey of Salt-Water Sport Fishing in Virginia, 1955-1960," by C. E. Richards, article, *Chesapeake*

Science, vol. 3, no. 4, December 1962, pp. 223-235, illus., printed, single copy 75 cents. Natural Resources Institute, University of Maryland, Chesapeake Biological Laboratory, Solomons, Md.

SPOT:

"Movements of Spot, *Leiostomus xanthurus*, in the Lower Chesapeake Bay," by Anthony L. Pacheco, article, *Chesapeake Science*, vol. 3, no. 4, 1962, pp. 256-257, printed. Department of Research and Education, Chesapeake Biological Laboratory, Solomons, Md.

SQUID:

A New Species of Cranchiid Squid, *PHASMATOPSIS LUCIFER*, from the Gulf of Mexico, by Gilbert L. Voss, Contribution No. 454, 7 pp., illus., printed. (Reprinted from *Bulletin of Marine Science of the Gulf and Caribbean*, vol. 13, no. 1, March 1963, pp. 77-83.) The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

STRIPED BASS:

"Distribution and Abundance of Striped Bass (*Morone saxatilis*, Walbaum) on the Florida Gulf Coast," by James M. Barkuloo, article, *Proceedings of the Fifteenth Annual Conference, Southeastern Association of Game and Fish Commissioners*, pp. 223-226, printed. Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1961.

TAGGING:

"On the Tagged Ratio Methods to Remove the Bias of Estimate Caused by Type C Systematic Errors in the Petersen-Type Tagging Experiment," by Yukio Nose, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 28, no. 7, 1962, pp. 686-694, printed. Japanese Society of Scientific Fisheries, Shiba-Kaigandori 6, Minato-ku, Tokyo, Japan.

TAIWAN:

Basic Data on the Economy of Taiwan (Formosa), by Maurice Kogon, OBR-63-34, 28 pp., printed, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., February 1963. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Discusses, among other items, the fishing industry, gear and vessels, record 1961 landings, and consumption of fishery products.

TEXAS:

Effects of Hurricane Carla on the Ecology of Redfish Bay, Texas, by Carl H. Oppenheimer, Contribution No. 453, 13 pp., illus., printed. (Reprinted from *Bulletin of Marine Science of the Gulf and Caribbean*, vol. 13, no. 1, March 1963, pp. 59-72.) The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.

TILAPIA:

"The Biology of *Tilapia nilotica* Linnaeus," by Luther G. McBay, article, *Proceedings of the Fifteenth Annual Conference, Southeastern Association of Game and Fish Commissioners*, pp. 208-218, printed. Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1961.

TOXICITY:

"Die Toxizität des Alpha-Pentachlorcyclohexens (1) gegenüber Fischen" (The Toxicity of the Alpha-

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Pentachlorocyclohexens (1) to Fish), by Miroslav Toman and Zdenek Stota, article, *Biologia*, vol. XVII, no. 6, 1962, pp. 460-462, illus., printed in German with Slovenian, Russian, and English abstracts. Vydava Vydavatel'stvo Slovenskej Akademie Vied, Bratislava, Czechoslovakia.

"The Toxicology and Toxicity of Toxaphene with Respect to Fish and Aquatic Food Animals," by R. Koeppel, article, *Biological Abstracts*, vol. 40, no. 6, Part 1, 1962, No. 21929, printed, University of Pennsylvania, 3815 Walnut St., Philadelphia 4, Pa.

TROUT:

"On Improving the Efficiency of Feed for Fish Culture. II--Digestibilities of Feeding-Stuff for Rainbow Trout and Some Trials on the Improvement," by Juami Yamada and Ryo Kikuchi, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 28, no. 9, 1962, pp. 905-908, printed, Japanese Society of Scientific Fisheries, Shiba-Kaigandori 6, Minato-ku, Tokyo, Japan.

Tests for Increasing the Returns of Hatchery Trout, February 1, 1961 to January 31, 1962, by Monte Richards and others, Federal Aid in Fish Restoration Project F 32-R-4, 29 pp., illus., processed, Fisheries Division, Department of Fish and Game, 518 Front St., Boise, Idaho, June 15, 1962.

TUNA:

"Little Tuna, *Euthynnus alletteratus*, in Northern Chesapeake Bay, Maryland, with an Illustration of Its Skeleton," by Romeo J. Mansueti and Alice J. Mansueti, article, *Chesapeake Science*, vol. 3, no. 4, 1962, pp. 257-263, printed, Department of Research and Education, Chesapeake Biological Laboratory, Solomons, Md.

"A Preliminary Report on Tuna in West Coast Waters of South Africa, Part 1," by B. van de Jager, C. S. de V. Nepgen, and R. J. van Wyk, article, *The South African Shipping News and Fishing Industry Review*, vol. XVIII, no. 4, April 1963, pp. 62-67, 69, 71, illus., printed, single copy 25 cents. Thomson Newspapers, South African (Pty.) Ltd., Trust House, Thibault Sq., Box 80, Cape Town, South Africa. Republic. The tuna fishery is a recent and promising addition to the South African fishing industry. Still in its infancy, this fishery is based on four species of tuna of which relatively little is known in that country. The purpose of this three-part article is to contribute to the knowledge of these four species--bluefin (*Thunnus thynnus orientalis*), longfin (*Thunnus alalunga*), yellowfin (*Thunnus albacares*), and bigeye (*Thunnus obesus*) tuna.

TURKEY:

Balik ve Balikcilik, vol. XI, nos. 3-4, March-April 1963, 30 pp., illus., printed in Turkish with English table of contents. Et ve Balik Kurumu G. M., Balikcilik, Mudurlugu, Besiktas, Istanbul, Turkey. Includes, among others, these articles: "Dolphin Processing with Semi Continuous Method;" "Decomposition of Fish Oils and Sea Mammal Fats, Studies of Conditions and Results;" and "Turbots."

UNITED ARAB REPUBLIC:

Basic Data on the Economy of the United Arab Republic (Egypt), by Warren F. Looney, OBR-63-95, 16 pp.,

illus., printed, 15 cents. Bureau of International Commerce, U.S. Department of Commerce, Washington, D. C., April 1963. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C.) Information on fishing includes resources, annual commercial catch, foreign trade, the fishing fleet, freezing and canning facilities, and other topics. The report discusses geography and population, structure of the economy, agriculture, petroleum and mining, industry, and electric power. Also covers transportation, communications, finance, foreign trade, a program of economic development, and marketing facilities.

VESSELS:

"Modern Fishing Vessels and Gear," article, *Trade News*, vol. 15, no. 10-11, April-May 1963, pp. 3-6, illus., processed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada.

VIET-NAM:

Basic Data on the Economy of Viet-Nam, OBR-63-5, 24 pp., illus., printed, 15 cents. Bureau of International Commerce, U.S. Department of Commerce, Washington, D. C., March 1963. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C.) Discusses, among other items, the fishing activity and its improvement through modernization with United States aid.

WEATHER CHARTS:

The following processed weather charts, 2 pp. each, are published by the Weather Bureau, U.S. Department of Commerce, Washington, D. C., and are for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C., 10 cents each. Charts show stations displaying small craft, gale, whole gale, and hurricane warnings, explanation of warning displays, and schedules of AM and FM radio, TV, and radiophone stations that broadcast weather forecasts and warnings.

Coastal Warning Facilities Chart, Cape Hatteras, N. C., to Brunswick, Ga., 1963.

Coastal Warning Facilities Chart, Eureka to Point Conception, Calif., 1963.

Coastal Warning Facilities Chart, Point Conception, Calif., to Mexican Border, 1963.

Coastal Warning Facilities Chart, Puerto Rico and Virgin Islands, 1963.

WHALES:

A Preliminary Investigation of the Blubber Oil from the Atlantic Bottlenose Whale, by P. M. Jangaard, R. D. Burgher, and R. G. Ackman, 3 pp., printed. (Reprinted from *Journal of the Fisheries Research Board of Canada*, vol. 20, no. 1, 1963, pp. 245-247.) Queen's Printer and Controller of Stationery, Ottawa, Canada.

WHALING:

"The Influence of Meteorological Factors on the Antarctic Whaling," by Kenji Kurogane and Takahisa Nemoto, article, *Norsk Hvalfangst-Tidende* (The Norwegian Whaling Gazette), vol. 52, no. 4, April

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

1963, pp. 89-104, illus., printed. Hvalfangerforening, Sandefjord, Norway.

"Oceanography and Whaling Ground in the Subarctic Region of the Pacific Ocean," by Keiji Nasu, article, *The Scientific Reports of the Whales Research Institute*, no. 17, February 1963, pp. 105-155, illus., printed. Whales Research Institute, Geirui Kenkyusho 12-4, Tsukishim-Nishigashi-dori, Chuo-ku, Tokyo, Japan.

WORLD TRADE:

"L'Accord Commercial France-Japan et le Marche de la Peche" (The French-Japanese Commercial Agreement and the Fishery Market), by Robert Lenier, article, *France Peche*, no. 72, April 1963, pp. 17-19, printed in French, single copy 2.5 NF (about 55 U.S. cents). France Peche, Boite Postale 179, Lorient, France.

YELLOW PIKE:

"Home Behavior of Spawning Walleyes," by Donald E. Olson and Warren J. Scidmore, article, *Transactions of the American Fisheries Society*, vol. 91, no. 4, 1962, pp. 355-361, printed. Secretary, American Fisheries Society, P.O. Box 483, McLean, Va.

"Homing Behavior in Walleyes," by Walter R. Crowe, article, *Transactions of the American Fisheries Society*, vol. 91, no. 4, 1962, pp. 350-354, printed. Secretary, American Fisheries Society, P.O. Box 483, McLean, Va.

YUGOSLAVIA:

Informativni Bilten (Information Bulletin), printed monthly in Serbo-Croatian. Institut za Tehnologiju Ribe, P.O. Box 110, Zadar, Yugoslavia. Contains, among others, the following articles:

No. 1-2, Jan.-Feb. 1962. "Variations of Fat Content in Adriatic Sardines during 1961," by H. Lisac.

No. 3-4, March-April 1962. "Fundamental Principles in Modern Quality Control," by D. Franolic; "The Quality of Water Used in Fish Canning Plants," by V. Strcaj; "The Quality Control of Vegetables Used for Canning with Fish," by P. Milic; "The Quality Control of Tomato Paste Used in Fish Canning Plants," by K. Brenko.

No. 5-6, May-June 1962. "Quality Control of Fish During the Preparation for Precooking," by V. Perovic; "Quality Control of Tin Plate Cans in Fish Canning Industry," by D. Franolic; "Quality Control of Fish as Raw Material," by S. Bacic and "Control of Cans Seaming," by K. Sepic.

No. 7-8, July-August 1962. "Control of Canned Fish Retorting," by P. Baralic and H. Lisac; "Some Problems in Quality Control of Canned Fish as Final Product," by S. Banjad.

No. 9-10, September-October 1962. "Quality Control of Other Raw Materials in Fish Canning Industry," by K. Sepic; "Quality Control during Salting and Storage of Salted Fish," by V. Perovic; and "Quality Control of Oil in Fish Canning Industry," by S. Banjad.

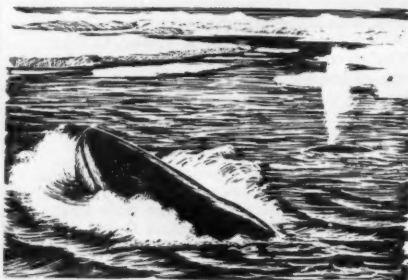
No. 11-12, November-December 1962. "Experimental Icing and Chilling of Sardines" and "A Note on Fat Content of Sprats," by H. Lisac.

--Listings under Yugoslavia supplied by K. Sepic.



SPEED OF WHALES

Blue whales, fin whales, and sei whales, migrating to summer feeding areas or to winter breeding places, moved at a speed considerably exceeding 15 m.p.h. for quite a long time; in a little more than one hour they could appear at the skyline, catch up with our vessel and disappear somewhat ahead of it. Therefore, they must have been moving at a speed of about 20 miles per hour --B. A. Zenkovich, reporting on sea mammals as observed by the round-the-world expedition of the USSR Academy of Sciences in 1957/58. (*Australian Fisheries Newsletter*, December 1962.)



Easy Does It...with TUNA



SUMMERTIME IS TUNA TIME

Wonderful tuna — flavorful convenience in a can — truly the chef's best friend. Always available, priced right and prepared so easily in so many sparkling ways. Versatile tuna goes with so many things — it flatters fruit — teams with greens — and coddles casseroles. Tuna sings in sandwiches, too! Terrific tuna, easy and elegant, bright and light, at your fingertips everywhere.

SPARKLING SALADS

Tempting Tossed Salad . . .

Spark interest in a bowl of tossed salad by adding chunks of delicious tuna.

Tuna Potato Salad . . .

Send an old stand-by soaring to new flavor heights by mixing chunks of tuna with your favorite potato salad.

Tuna Louis . . .

Top shredded lettuce with a generous portion of flaked tuna. Cover with a spicy Louis Dressing and garnish with tomato wedges.

Tuna Slaw . . .

Give added interest to a crisp cabbage slaw with chunks of luscious tuna.

Macaroni Salad . . .

For a delicious flavor accent, try adding chunks of tuna to your macaroni salad.

Glorified Fruit Salad . . .

Make a summer fruit salad extraordinarily good with the addition of chunks of tuna and a sprinkling of toasted almonds.

Summer Seagarden . . .

Tomatoes stuffed with tuna salad are hearty main dish salads for hot weather appetites.

Surprise Aspic . . .

Accent a spicy tomato aspic by folding in flakes of hearty tuna. Serve on salad greens, garnish with avocado slices and nippy sour cream dressing.

Summer Sparkler . . .

As a variation on the ever popular waldorf salad add chunks of tuna for a wonderful flavor combination.

QUICK CASSEROLES

Tuna-Macaroni Au Gratin . . .

Add chunks of tuna to your macaroni and cheese. Bake in individual casseroles with a tomato slice on top.

Tuna Stroganoff . . .

For an easy but elegant luncheon dish serve Tuna Stroganoff. Heat tuna, condensed tomato soup, sour cream, and sliced mushrooms. Season with tabasco, Worcestershire sauce, a little salt and pepper. Serve over parsley-rice.

Tuna Italiane . . .

Make a sure-fire hit with Tuna Lasagne. Use

your own special lasagne recipe but use tuna in place of the regular meat.

Tuna Imperial . . .

Combine tuna, condensed cream of mushroom soup, cooked peas, and a dash or two of pepper. Place in individual casseroles, top with grated cheese and bake until heated through.

Tuna Tomato Medley . . .

Stuff tomatoes with a combination of flaked tuna, cooked rice, grated cheese, beaten egg, and seasonings. Bake until tomatoes are tender.

Tuna Casserole Quickie . . .

Make a casserole of tuna and drained cut green beans, topped with cream of mushroom soup sauce subtly seasoned with curry powder. Sprinkle with a mixture of grated cheese and bread crumbs. Bake until bubbly.

Southern Tuna Favorite . . .

Add chunks of tuna to a rich and colorful a la king sauce. Serve over hot cornbread. Delicious!

SATISFYING SANDWICHES

Open Face Special . . .

On toast — arrange crisp lettuce, tomato slices, and flaked tuna. Top with Louis Dressing and garnish with hard-cooked egg slices.

Tuna Cheese Dreams . . .

Make a delightful sandwich spread by combining flaked tuna, cream cheese, chopped ripe olives, toasted slivered almonds, and drained crushed pineapple, mixed to spreading consistency with a little lemon juice.

Tuna-Cheese Melting Moments . . .

Spread bread with mustard-butter. Cover with tuna salad and top with a slice of pimiento

cheese. Bake in a very hot oven until bread toasts and cheese melts. Wonderful with soup or a chef's salad.

Luncheon Special . . .

Tuna salad sandwiches, dipped in french toast batter, and fried to a golden brown. Wonderfully good!

Meal in One . . .

Variation on a popular theme — Tuna Submarine. Spread submarine rolls with your favorite tuna salad. Top with onion rings, tomato slices, cheese, and lettuce.

Tuna Pizza . . .

Looking for a new pizza flavor combination? Spread pizza crusts with pizza sauce, and top with flaked tuna, ripe olives, and mozzarella cheese.

Hot and Hearty . . .

Serve a thick, juicy tuna burger topped with a tomato slice and mayonnaise.

Tuna Rarebit Deluxe . . .

A super duper luncheon sandwich! Add chunks of tuna to cheese or tomato rarebit and serve piping hot over asparagus spears on toast.

Issued by Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service and the U. S. Department of Agriculture as Part of a Continuing Marketing Program in Cooperation with the Fishing and Agricultural Industries



TAKE IT EASY WITH TUNA

For appetizing recipes see p. 143.

